

FLIGHT

First Aero Weekly in the World.

Founder and Editor : STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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EDITORIAL COMMENT.

THE effect of our inauguration of a policy of reprisals for the dastardly torpedoing of hospital ships and the murder of defenceless nurses and wounded soldiers, has been immediate and salutary. As we might have expected, knowing the Hun mentality as we do, the air raid on Freiburg has produced a characteristic squeal of mingled terror and indignation. "Several human lives," the German official report says, "were sacrificed to this iniquitous attack." Iniquitous, of course, since they were German lives, and not British or French or Russian, that were sacrificed! The report goes on to inform the world that at Freiburg there are no objects of military importance which could justify the attack—it is cheap glory to attack open towns for vengeance! This latter is what we have always contended, but it is the sort of "glory" at the collection of which the Hun has shown himself to be particularly expert since the very earliest days of the war. The bombardment of Scarborough by a powerful naval force was a case in point. There

"human lives were sacrificed to iniquitous attack," and we did nothing but protest to the world that such acts were not in consonance with the law of nations or with civilised usage. Such trivial considerations as these carried no weight with the enemy command, which proceeded by way of answer to the argument to inaugurate a consistent policy of air raids on open towns and villages in this country, in the course of which many more human lives were sacrificed for the sake of no military effect whatever. Still we made no reply save by verbal protest, with the result that the Hun went on from iniquity to worse iniquity, culminating in the cynically barbarous announcement that in future hospital ships were not to be allowed to traverse the seas in safety. From announcement to achievement was only a short step, and the former was followed almost immediately by the sinking of the "Gloucester Castle." Even the worm will turn, and this was the culminating tragedy that was needed to show the British Government that the time had gone by to confine its action to mere protest, and that if any semblance of decency could be infused into the German method of making war, it could only be so infused through terror, which is the one emotion of which the Hun seems capable. It is a pity, we agree, that we are reduced to thus meeting frightfulness with the like, but when we have to deal with brutes whose code is that of the beasts of the jungle, then we are compelled to use the only methods that are likely to appeal to their instincts.

Over and above the policy of air raids, we are more than pleased to know that in future our hospital ships are not to bear the sign of the Red Cross and that they are to carry a proportion of wounded Germans. The Hun submarine commander, therefore, who essays to torpedo a defenceless merchantman will be faced with the possibility that what he is in fact attacking may be a hospital ship and that he may be sending to their deaths a few score of his own helpless countrymen. Whether that will influence him may be open to doubt, but a few more such incidents as that of the "Lanfranc" must inevitably have their effect in such public opinion as is allowed expression in Germany—except that that opinion may come round to the conclusion that men who can display such abject cowardice as that exhibited by the officers and men of the vaunted Prussian Guard would not be much loss to the nation anyway. And before we leave the subject we should like to ask this

question :—Is it an order or not that when a hospital ship carrying British and German wounded is torpedoed by an enemy submarine, no German is to be saved until every one of our own men has been got safely away? We do not know whether this is the case or not, but we submit that it ought to be, because unless the thing is made clear by a definite order, we have reason to believe that the innate chivalry of our own people will too often impel them to give everyone an equal chance, possibly even to differentiate in favour of the Germans.

**Bureaucracy
and
Expenditure.**

It is with the greatest possible satisfaction that we regard the action of a representative number of Members of Parliament who have tabled a resolution demanding that a committee be appointed with power to review all national expenditure, examine Ministers and officials, and report to the House—and therefore to the public. In a letter addressed by this Party to the Press, the point is made that the House of Commons is powerless to exercise either control or influence over the national expenditure. The Government have decided to rule without the House; the Treasury has waived its control; most departments are a law unto themselves; and no one interposes to check their expenditure. It may be within the recollection of our readers that, in introducing the Budget of last year, the then Chancellor of the Exchequer stated that our "total expenditure for this present financial year would be £5,000,000 per day." He added :—"I confess frankly that I shall be disappointed if serious economies cannot be effected in the course of the year, and this large total reduced." What has been the result of these "economies"? During the year the number of new departments of the Government which have been brought into being to "control" one thing or another has been such that we frankly do not pretend to recollect their total. The creation of these new departments has made for so great economy that instead of the war costing us five millions, the national expenditure has grown to more than seven millions a day. In addition, with the establishment of each new department we have seen yet more of our liberties filched from us, until the sum total of the position is that we are paying out colossal sums of money in order to support a bastard Prussianism without a tithe of the Prussian efficiency which is the only justification of bureaucracy. To put it in a few words, we are the most official-ridden nation on earth at the present time and we are paying more *per capita* for the privilege than any people have done since the dawn of history.

If the Party to which we have referred—which has the support of over 160 members of all parties, made up of 50 Unionists, 90 Liberals, 15 Labour, and the Irish Nationalist leaders—can force the hands of the Government and achieve what they are after, they will have gone one step along the road to reform. But we doubt if they will find the Government in the least disposed to surrender any part of the autocratic powers they have taken to themselves—at any rate, so long as the end of the war remains out of sight. They—that is, the anti-extravagance party—might with great advantage go a step farther and form themselves into a party for securing the repeal of the Defence of the Realm Act the moment the war is over, with the automatic abolition of the numerous parasitical growths that have sprung up under its evil influence. Short of that, we do not see

how we are going to rid ourselves of the present plethoric officialdom for generations to come.

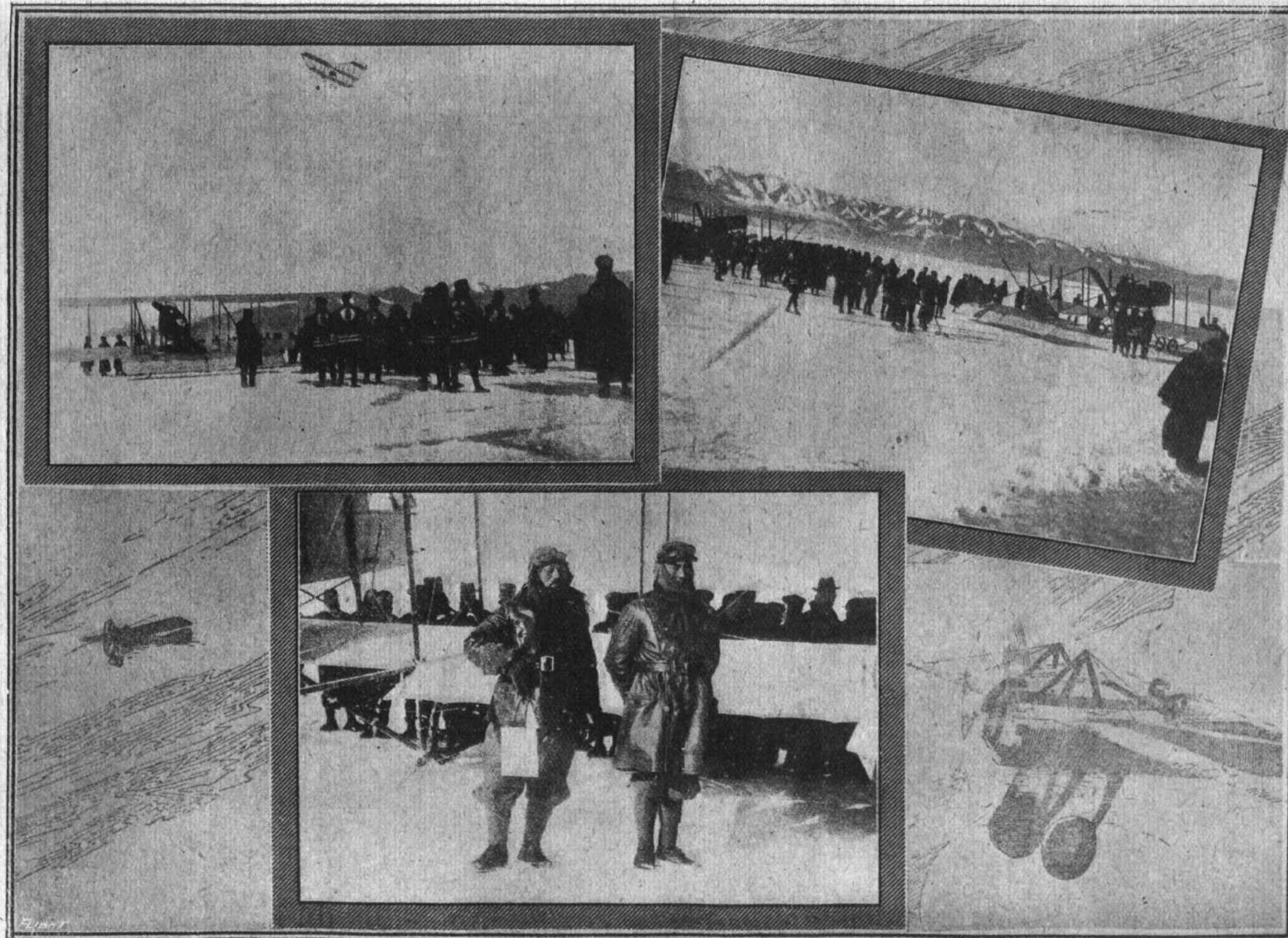
**Officialism
Run Mad.**

In every connection we see around us the evil consequences of the present predominance of the official. As an example of this, the treatment of the press photographers on the occasion of the American Dedication Service at St. Paul's last week may be taken as a case in point. Although armed with the usual police permits, these men, who are as much the servants of the public as of their employers, were ruthlessly excluded from every possible point of vantage, while every facility was given for the taking of photographs by men in the uniform of the Royal Flying Corps. Moreover, the Pressmen were, to our knowledge, treated in several instances with the grossest rudeness by officials, police and others.

Does the Government, among other things, intend to create a monopoly of pictures of public interest? Does it mean to close down yet another business and take it over itself? Or was the occasion simply taken advantage of to drive home to the people that at last the official has attained to the summit of his desires, and that he, and he alone, is the master and the public merely sheep to be driven whither he lists? For our own part, we are not particularly interested in the occasion on which these things happened, so we are not labouring under any sense of personal grievance, but to our way of thinking it has come to a pretty pass when honest men are prevented from earning their living and the resources of a fighting portion of the King's forces are taken to do their work. Moreover, it seems to us that there is a distinct snub to our American Allies implied in the action of whoever was responsible. The fiction is that the photographs of the King's progress to the Cathedral are "for official purposes only." Therefore, they cannot be sold to the Press. It seems to us that, apart from the legitimate interest that our own people are likely to feel in the doings of His Majesty and the importance of the occasion, the American people would have been very keen on seeing the manner in which one of the greatest events in their history was celebrated over here. That privilege has been denied to them by the crass stupidity of someone in authority here. A worse case of officialism run mad we have seldom come across, and we trust that something will be said in Parliament about it.

**The
Germans
and the
Dead.**

It is not too much to say that the exposure of the loathsome methods of dealing with their dead who die in battle adopted by the Germans, has sent a thrill of horror through all the civilised world. That any nation calling itself civilised can descend to such horrible desecration of the bodies of those who die in its defence as to render them down for the sake of the oil and fat to be obtained from them would be absolutely incredible did the facts not rest on the best of all evidence. That evidence rests on, first of all, a report from one of the accredited German correspondents in the war zone. It is borne out by other witnesses who aver that the facts have been well known in both Holland and Belgium for many months past. Last of all, it is confirmed by the disingenuous *dementi* sent out by the German Wireless Press, which does not attempt to deny directly that the story is a true one.



Japanese military cross-country flight, showing the start, in the air, and the two pilots. (From the "Japanese Aeronautical World.")

There are no words in this, or in any other language, adequate to express the disgust and loathing that is inspired by reading the horrible story of the last refinement (sic) of Hunnish *Kultur*. Yet it is no more than we ought to have expected of a nation which at the end of the Thirty Years' War, actually established public kitchens for the cooking of human flesh. One of their own historians, Hausser, comments upon the coolness with which his nation took to cannibalism. As the Germans appear to have inherited most of the evil instincts of their ancestors of the times of Attila, it surely ought not to surprise us that the traits of a mere two hundred years ago should be reproduced in the people of the present time.

It is to be hoped that our own Government will lose no time and spare no trouble in letting the neutral peoples of the world know of this last phase of *Kultur*. Particularly must it be spread among the Mohammedan peoples that the ultimate destiny of the human body, according to the German idea of things, is the pig-trough. That should surely be enough to cause the very name of Germany to stink in the nostrils of all good Mohammedans for generations to come. For ourselves it hardly needed this to fill the measure of contempt and loathing with which we regard this accursed race—it merely confirms us in the opinions already formed.

"The British Republic."

The republican outburst of Mr. H. G. Wells in the *Times* does not appear to have received the welcome the famous novelist must have anticipated when he penned his letter. As a matter of fact, all it has received has been a liberal douching with the coldest of cold water. At that we are not in the least surprised, and we do not imagine that Mr. Wells himself will be astonished when he realises the exact effect of his letter to the *Times*. It is true he has tried to explain that he really did not mean to advocate a republican Britain and that his theories were meant only to include nations less happy in their form of government than our own, but the belated explanation is very far from convincing. It looks as though, having realised that he has put his foot in it, he is trying to hedge.

As to the merits of the discussion, as it has, we suppose, become, there is really only one side to it. However much the individual may incline to the doctrines of democracy and republicanism, and, however good an abstract case might be made out in favour of a republican England, we must never lose sight of the salient fact that with the adoption of that form of government the British Empire would cease to exist. Could we hold the Dominions under a republican government, or would they ultimately—and sooner rather than later—become each a separate republic, independent altogether of the Motherland? We believe the latter. And what of India, which is not ripe for republicanism by a couple of centuries? We are honestly of opinion that under a republic

we could only hold India by the sword. The people who advocate a change in the constitution which would substitute a president for the monarch forget that there are peoples within the Empire to whom the latter is a symbol of power, at once almost mystic and yet of tangible authority—symbolic, in a word, of the very being of the State. It is impossible, we verily believe, that a republican president could stand in the same relation to these peoples as a constitutional king. That without any other reasoning is quite enough to condemn the whole idea of republicanism as it might apply to what we are proud to call the British Empire.

Our Air Losses.

Lord Desborough appears to have associated himself with those who deplore that the Air Service in France has been made the butt of what he described in a speech at Leeds as carping criticism. Our flying men, he said, had been very depressed as a result of these criticisms, which were mischievous and ill-founded. Now, as we said last week, our Air Service in France has *not* been criticised in any such manner as Lord Desborough seems to imply. On the contrary, the active part of the Air Service has received nothing but the unqualified praise it has richly earned. The criticism that has been made has been directed solely at the faults of administration over here, and that it was very much called for is evident when we regard the many changes that have been made in the administrative sections since the war began. Those of the chameleon convey the best simile that occurs to us at the moment. If everything was as good as the official apologists would have us believe, why have those multitudinous changes been made? Surely it would have been better to have left well alone than to have made a hobby of swapping horses in the middle of the stream. As a matter of fact, we need look no farther than the pages of Hansard and the replies of Ministers for the justification of the bulk of the criticism that has been passed on our air organisation.

We like much better the tone of Sir David Henderson on the same occasion, when, keeping clear of all controversy, he said:—

"I will tell you that these young men are the very salt of the earth. Although I may be prejudiced, I put it to you that for cool courage, for the high spirit and enterprise that seek adventure, for self-sacrifice and for devotion, there has been nothing to equal the Royal Flying Corps."

With that we are all in the fullest accord. Let us hope that for the future our organisation will be found to be so improved that these devoted and self-sacrificing officers will not be sent out to meet the enemy with anything but the very best equipment and machines that skill can devise or money procure. Let that be ensured, and criticism will automatically cease to be.

British Airship Lost.

THE Secretary of the Admiralty issued the following on April 23rd:—

"One of His Majesty's airships left on patrol from an East Coast air station on the morning of the 21st instant, and has not returned. Reports received state that an airship was seen to descend in flames in the Straits of Dover about noon of the same day. An aeroplane or seaplane was seen in the vicinity shortly before the occurrence, and it is believed that the missing British airship has been destroyed by hostile

aircraft. The position given is a considerable distance from the area in which the airship should have been working, and it is probable that her engine power had failed, and that she had drifted a long distance with the wind. Extensive search has been made where she fell, but no trace of the crew nor any portion of the ship has been found, and it must be assumed that all the crew are lost. The relatives have been informed."

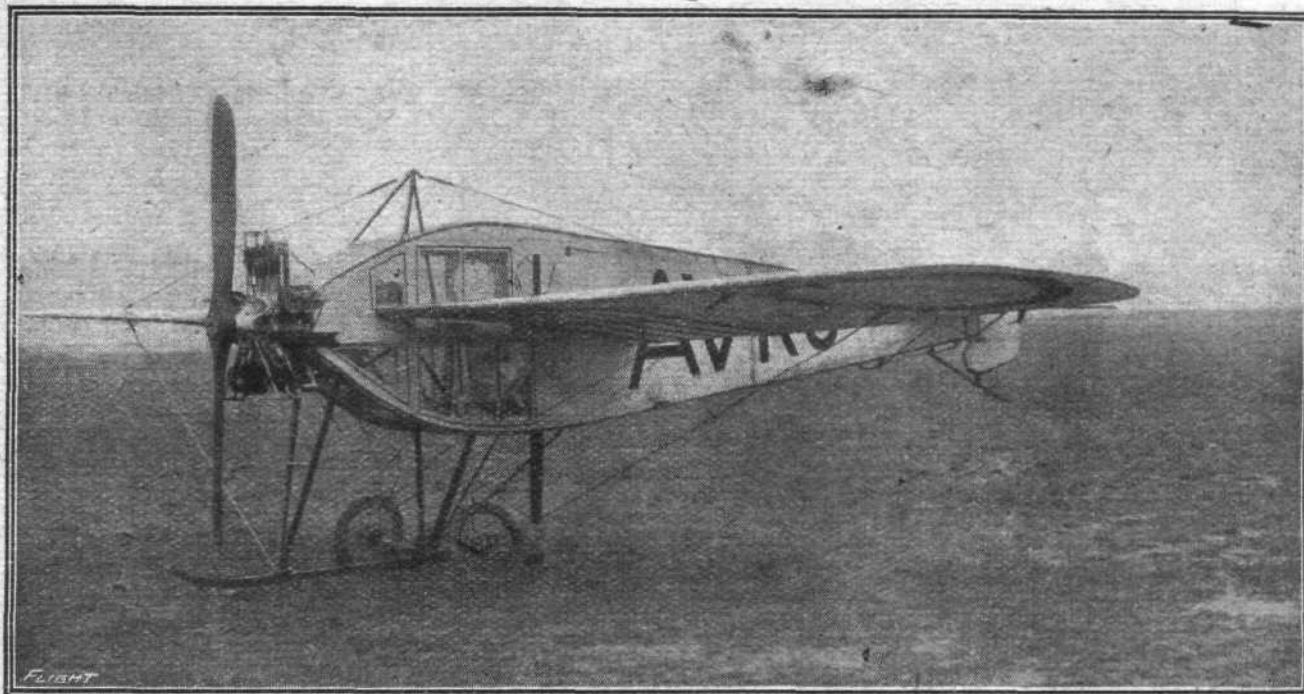
The German *communiqué* issued on April 22nd stated:—"Naval aviators off Nieuport brought down an enemy airship, which fell into the sea in flames."

THE "TOTALLY ENCLOSED" AEROPLANE.

(Continued from page 365.)

It has already been recorded that at the Aero Show held in Berlin in April, 1912, two enclosed machines were exhibited—the Rumpler and the Bavarian Aircraft Works monoplane. At about the same time, early in April, 1912, there arrived at Brooklands aerodrome a new monoplane from the Avro works.

windows in the sides as well as in the roof and floor. Round the windows the covering consisted of sheet aluminium, while the rear part of the body was covered with fabric. Access to the interior was obtained through an aluminium trap door in the roof, and the pilot was comfortably seated inside, with



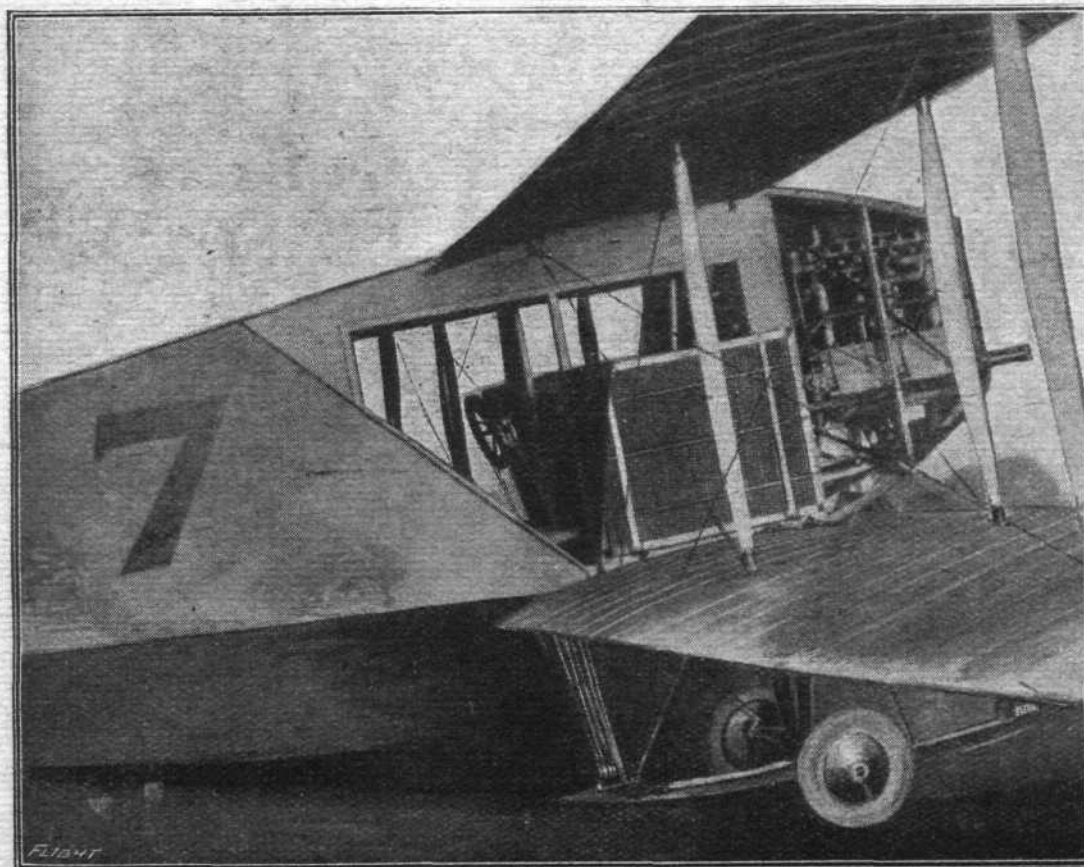
The enclosed Avro monoplane of 1912.

During the weeks that followed this machine was taken through its tests by the late Lieut. Wilfred Parke, R.N., who put up some very good performances, and demonstrated for the first time in England the practicability of the all-enclosed aeroplane.

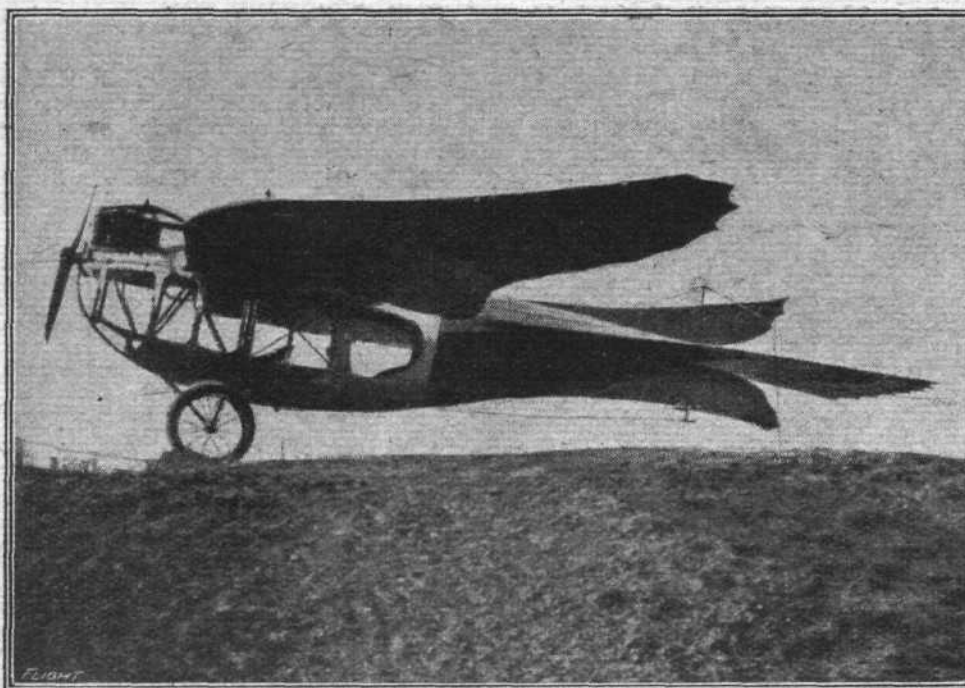
A good idea of the general arrangement of the Avro enclosed monoplane can be formed from the accompanying illustration. The body, which was of rectangular section, had flat sides, top, and bottom. The front part of it was fitted with celluloid

the warp and elevator lever between his knees, his feet resting on two pedals pivoting on a transverse steel tube and operating the rudder. His switch, throttle, and spark advance levers were mounted on the right-hand side of the body, and his various instruments—altitude recorder, compass, revs. indicator, watch, map holder, and inclinometer—were arranged conveniently around him.

When the machine first made its appearance at Brooklands it was generally thought that, with the respiration of the pilot



The enclosed Avro biplane, built for the Military Trials of 1912.



The enclosed Etrich Taube,
built and flown in Austria
in 1912.

inside and fine spray of oil thrown out with the exhaust of the engine, the windows would soon become clouded over, and render clear vision impossible after a few minutes' running. In practice this was not found to be the case, and after the longest flight made on this machine, the window in the floor was the only one that showed any signs of mistiness. The engine fitted was, it should be remembered, a Viale, which had no auxiliary exhaust ports in the cylinders, but on the other hand no exhaust pipes were employed to lead the gases away from the windows. Had this been done there appears to be no reason to suppose that the window underneath would have clouded over at all. As a precautionary measure a circular opening was provided in each side of the body, on a level with the pilot's head, so that if the windows should get covered with mist or rain it was possible, by looking out through these openings, to obtain a reasonably good view. After several months of very good flying the Avro monoplane was damaged through running into a wire fence that the pilot had failed to notice, and as the firm were then busy on their other machines the monoplane was put on one side, having during its short career provided quite a lot of useful data for the biplane of similar type which was being got out for the Military Trials.

Probably the Avro enclosed biplane is best remembered, and will go down to history, as the machine on which the late Lieut. Wilfred Parke, R.N., had the nasty experience that became known to all the aviation world as "Parke's Dive." That the machine came out of this bad spin without breaking anything is not only an outstanding testimony to Avro design, but is of far greater significance in showing that, even with such a great amount of side area, a machine need not be uncontrollable in a bad spin, provided the pilot knows what to do. This Lieut. Parke only discovered at the last moment, but when he put her to it the machine answered the controls at once.

Except for the fact that it had two pairs of wings the enclosed Avro biplane was very similar to the monoplane already described. The main planes were attached to the upper and lower longitudinals of the body respectively, and pilot and passenger were seated tandem fashion inside. Entrance to the body was through a triangular door in the side, this being shown in our illustration. The engine, a 60 h.p. Green, was mounted in the nose of the body, which had here a width of only 15 inches, this being made possible by the fact that the engine was of the vertical type. The radiators were mounted on the side of the body in front of the door. Forming a partition between what may be termed the "engine room" and the occupants' cockpit was a large dashboard with all the instruments. These were therefore, as the passenger sat in front, some distance away from the

pilot, who had to look over the passenger's shoulders in order to read the instruments.

The number of windows had been reduced, in this machine, to a long rectangular opening in each side of the body, but the interesting fact was disclosed after a few flights, that during straight flying no draught was felt by the occupants. When the machine was turning and banking a slight wind from the side was noticed, but not sufficient to be in the slightest degree uncomfortable. Although the Avro enclosed biplane was undoubtedly very promising in many respects the authorities did not encourage the production of this type, otherwise the totally enclosed aeroplane might have been very considerably more advanced than is now the case. When the war is over and this type will once more have to be studied seriously, it is to be hoped that the Avro firm, who pioneered the type, will be among the first to take it up again.

During the spring and summer of 1912 the Austrian Etrich firm built and experimented with an enclosed monoplane of the Taube type. As our illustration shows, this machine was very similar in general arrangement to the ordinary Etrich taube, with the exception that the body had been made considerably more roomy. Constructionally the body was of the girder type with a superstructure giving the covering an elliptical form in section. Windows of non-inflammable material were provided in the sides and nose, and as the engine was mounted very high up in the body, the view forward and downward was exceptionally free, considering that the machine was of the tractor type. The two seats were placed one behind the other, and the pilot occupied the rear one. Apart from the fact of it being enclosed, this monoplane was a departure from standard practice in other respects. For instance, the under-carriage was of the simple Vee type that is so popular on modern machines, but which had not become generally adopted at that time. The wings, which had the usual back swept and upturned tips characteristic of the taube, were attached to the body by a single tubular pivot, and provisions had been made for varying the angle of incidence during flight. This was accomplished by rotating a wheel mounted in the body to the right of the pilot.

For some reason no more machines of this type were built by the Etrich firm, whether this is due to the enclosed feature or to other causes. Probably the reason was that, like so many others, this new departure had too many unknown factors. On the face of it, it would appear that the centre of thrust was too high, being approximately in line with the intersection of the chord line and the resultant, while the centre of resistance of the body and that of the under-carriage were some distance below this point.

(To be continued.)

"Works Organisation."

At the meeting of the Institution of Automobile Engineers on Wednesday, May 9th, 1917, at the Royal Society of Arts, John Street, Adelphi, W.C., at 8 p.m., Mr. A. W. Reeves will read a paper on "Works Organisation." An

invitation is extended to all those interested in the subject to be present at the meeting, and a card of invitation may be obtained by forwarding a stamped, addressed envelope to the Secretary, Institution of Automobile Engineers, 28, Victoria Street, London, S.W. (1).

HONOURS.

Honours for the R.N.A.S.

In a supplement to the *London Gazette* issued on April 22nd, it was announced that the King has been graciously pleased to give orders for the appointment of the following officer to be a Companion of the Distinguished Service Order:

Flight-Lt. (Actg. Flight Comdr.) B. C. BELL, R.N.A.S.

For conspicuous bravery and skill in attacking hostile aircraft. Since February 1st, 1917, he has taken part in 14 aerial combats, notably: On March 17th, 1917, on two different occasions during the same offensive patrol he attacked and drove down hostile machines, one completely out of control and the other in flames. On March 24th, 1917, he attacked a hostile machine which was diving on one of our machines. After he had fired about 30 rounds at a range of about 50 yards the hostile pilot fell back, and his machine went down spinning and side-slipping completely out of control.

The King has also been graciously pleased to approve of the award of the Distinguished Service Cross to the under-mentioned officers:—

Flight-Lt. (now Act. Flight-Com.) C. C. R. EDWARDS, R.N.A.S.
Sub-Lt. C. K. CHASE, R.N.V.R.

In recognition of their services on March 1st, 1917, when they were attacked by two hostile machines whilst on a reconnaissance flight, and brought them both down out of control. Flight-Lieut. Edwards was hit by a bullet, which passed through the left shoulder, fracturing the collar-bone, and at the same time was slightly wounded in both feet. Although suffering considerably, he brought his machine home safely, in spite of being again attacked by two hostile aircraft. By his determination and pluck he probably saved his own life and that of his observer.

Flight-Comdr. A. W. CLEMONS, R.N.A.S.

Sub-Lt. J. L. KERRY, R.N.V.R.

In recognition of their conspicuous gallantry on February 28th, 1917, when they carried out a reconnaissance of Rayak and Damascus in a seaplane. During this fight they crossed two mountain ranges whose lowest ridges are 4,000 ft. high, and brought back valuable information.

Lt. (now Lt.-Comdr.) E. CHILDERS, R.N.V.R.

In recognition of his services with the R.N.A.S. for the period January-May, 1916. During this time he acted as observer in many important air reconnaissances, showing

remarkable aptitude for observing and for collating the results of his observation.

Flight Sub-Lt. H. E. P. WIGGLESWORTH, R.N.A.S.

For conspicuous gallantry and enterprise on January 23rd, 1917, during a bomb attack by aircraft when considerable damage was done to enemy blast furnaces at Burbach. During this flight he fought five engagements with enemy aircraft in formations of three, four and five at a time.

Sub-Lt. (now Lt.) E. B. C. BETTS, R.N.V.R.

In recognition of his services on February 1st, 1917, when he carried out a long reconnaissance and returned with extremely important information, shooting down an enemy scout machine which attacked him on his way back.

The following award has also been approved:—

To Receive the Distinguished Service Medal.

O.N.F. 7088 Act. Air-Mech., 1st Grade, WALTER BUNCE.

The following officer has been mentioned in Despatches:—

Flight-Lt. HENRY GUY HOLDEN, R.N.A.S.

Foreign Honours for the R.N.A.S.

The following decorations have been conferred by the Allied Powers on officers and men of the British Naval Forces for distinguished services rendered during the war:—

By the President of the French Republic.

LEGION OF HONOUR.

Officer.

Capt. WILLIAM ELDER, R.N. (Wing Capt., R.N.A.S.).

Chevalier.

Wing Comdr. RICHARD B. DAVIES, V.C., D.S.O., R.N.

CROIX DE GUERRE.

Flight Sub-Lt. HORACE E. P. WIGGLESWORTH, R.N.A.S.

Flight Sub-Lt. FRED C. ARMSTRONG, R.N.A.S.

Flight Sub-Lt. RONALD F. REDPATH, R.N.A.S.

Flight Sub-Lt. PERCY G. McNEIL, R.N.A.S.

Flight Sub-Lt. RAYMOND COLLISHAW, R.N.A.S.

O.N.F. 2932 1st Class Air-Mech. SYDNEY HERBERT PINCHEN.

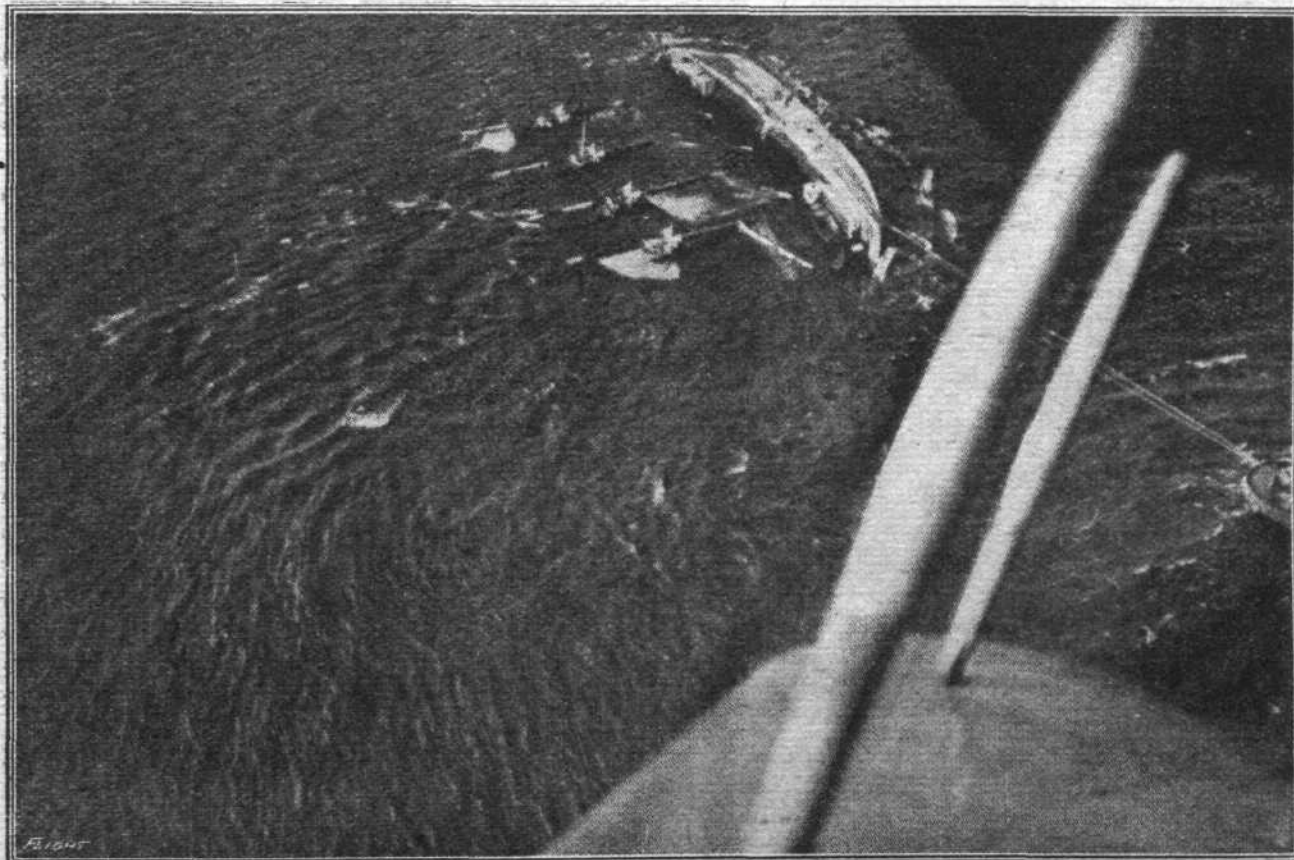
By the King of the Belgians.

ORDER OF LEOPOLD.

Chevalier.

Lt. DENYS C. G. SHOPPEE, D.S.C., R.N.

The King has given unrestricted permission to the officers and men concerned to wear the decorations in question.



Photograph of a schooner brought to grief by a Cunard boat off Governor's Island. Taken by Charles Reed from a height of 500 ft. (By courtesy of "Flying" New York.)

STEELS USED IN AERO WORK.

BOTH the paper on the "Use and Abuse of Steel," presented by Lieut.-Col. R. K. Bagnall-Wild and Lieut. E. W. Birch to the Institution of Automobile Engineers, and the one on "Steels used in Aero Work," read by Dr. W. K. Hatfield before the Aeronautical Society last week, furnish a good deal of valuable information on a subject which is becoming increasingly important. In the former paper (which is now appearing in "FLIGHT") the authors discussed many of the difficulties which have been met with in practice, and a study of their conclusions should enable manufacturers to avoid trouble; while Dr. Hatfield in his paper discussed the subject chiefly from the metallurgical point of view. He emphasised the necessity for engineers responsible for the building of aeroplanes and engines, if they are to obtain anything like the best results from the materials now available, to study the characteristics and properties of those steels.

They should understand the reason for the various heat treatments, and should appreciate the considerations which lead to the selection of any particular one as the means of placing the steel in the final condition in which it may be expected to do the best service. There were two essentials in steel for aero work—(1) the use of high-class material, and (2) scientific methods in works practice.

Discussing the question of factor of strength, Dr. Hatfield said that, although it had been pointed out on many occasions

that the use of the term "factor of safety" was misleading, yet the erroneous use of the term still continued. It appeared to him that a true "factor of safety" should be the ratio between the stress which may be safely applied indefinitely under the actual working conditions to the stress actually employed, and not the ratio of ultimate stress of the material under a static test to stress thought to exist in practice, as calculated from imperfect data combined with many doubtful assumptions. This latter ratio, whilst very useful in formulating empirical rules, should really come under a very different name, such as, for instance, "factor of contingency," already proposed by Mr. Lanchester.

The actual values of this factor, employed in modern design, have been arrived at largely by the method of trial.

Dr. Hatfield suggested that better results might be obtained, and fewer mysterious failures result, if the various contingencies to be allowed for were carefully examined and the "factor" placed on a more definite basis.

Dr. Hatfield also suggested that the several parts which had to be dealt with in aero work are really sufficiently small to permit conveniently of numerous quantitative destruction tests, and if more of these were made the engineer would be better able, in a practical manner, to obtain definite data upon which further progress in design might reasonably be expected.

Air Work in East Africa.

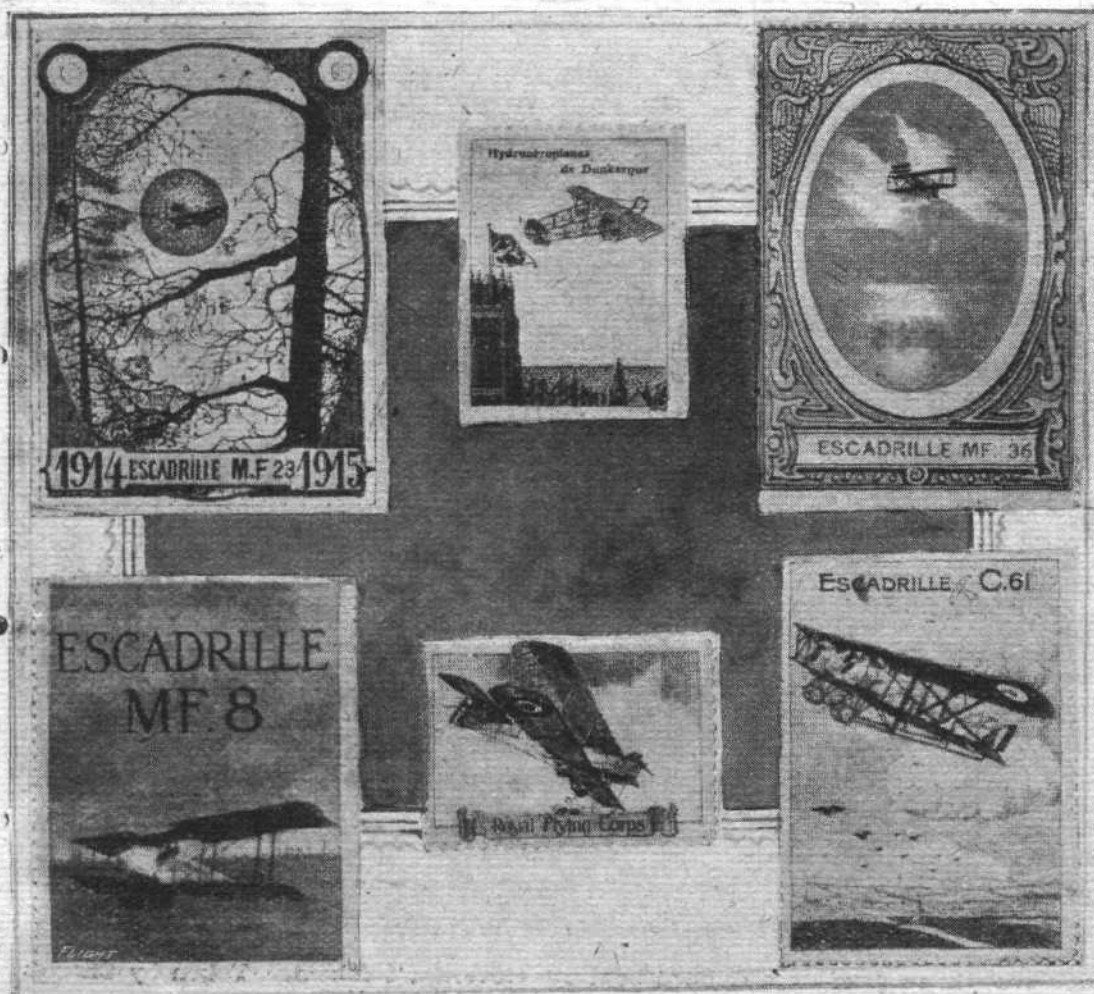
IN the despatch from Lieut.-General the Hon. J. C. Smuts, K.C., covering the operations in East Africa from October, 1916, to January, 1917, there is the following reference to air work:—

"The air reconnaissances this day showed that the repair of the Rufiji bridge at Kibambawe had been nearly completed by the enemy, who had for some days been working to make good the damage caused by flood. The bridge had been

constantly bombed by the aeroplanes, which did consistently excellent work throughout the operations."

To Protect the Kaiser.

INFORMATION received in Zurich from Frankfort last week indicated that elaborate precautions were taken to protect the Kaiser from possible air attacks during his "cure" at Homburg. A number of aviators are stationed at Homburg, and anti-aircraft guns have been placed in the Kurpark and on the Taunus heights in the vicinity. The roof of the Imperial residence is covered with metal netting and sandbags.



These reproductions of four French, one British, and one Belgian postage stamps used by six flying squadrons of the Allied armies on the Western front, were made from originals in the collection of Dr. J. Darwin Nagel of New York. These stamps are printed in various colours, and are used in connection with home correspondence by the aviators and others attached to the Flying Corps.

(From "Flying," New York.)

THE ROLL OF HONOUR.

REPORTED by the Admiralty:—

Killed.

Flight Sub-Lieut. D. H. Masson, R.N.

Accidentally Killed.

Prob. Flight-Officer J. L. Lavigne, R.N.

Prob. Flight-Officer F. H. J. Litcomb, R.N.

Accidentally Injured.

Flight Officer G. M. Emerson, R.N.

Prob. Flight Sub-Lieut. A. C. Kermode, R.N.

Flight Sub-Lieut. A. H. Munday, R.N.

Wounded.

F 176 Ldg. Mech. D. Cripps, R.N.A.S.

Reported by the War Office:—

Killed.

2nd Lieut. O. F. G. Ball, R.F.C.

2nd Lieut. G. C. Burnard, R.F.C.

2nd Lieut. S. R. Carter, Lancs. F., attd. R.F.C.

2nd Lieut. W. W. Cowan, R. Scots., attd. R.F.C.

2nd Lieut. C. T. L. Donaldson, Yeo. and R.F.C.

Lieut. M. A. A. Lillis, R. Irish, attd. R.F.C.

2nd Lieut. C. P. Long, R.E., attd. R.F.C.

2nd Lieut. C. Macintosh, R.F.C.

2nd Lieut. N. W. Morrison, R.F.C.

61782 2nd Air-Mech. J. Boon, R.F.C.

711 Flight-Sergt. S. H. Quicke, R.F.C.

12708 1st Air-Mech. F. Russell, R.F.C.

Accidentally Killed.

10096 2nd Air-Mech. E. C. Rawson, R.F.C.

Previously reported Missing, now reported Killed.

Capt. C. P. Bertie, R.F.A. and R.F.C.

2nd Lieut. A. Douglas, R.F.A. attd. R.F.C.

2nd Lieut. A. J. Fisher, R.F.C.

Lieut. H. R. Hele-Shaw, R.F.C.

2nd Lieut. V. F. H. Hugil, R. Fus., attd. R.F.C.

2nd Lieut. P. A. Russell, Cameron H. and R.F.C.

Lieut. W. G. Warn, R. Sussex, attd. R.F.C.

Died of Wounds.

2nd Lieut. F. Bower, Numberland. Fus., attd. R.F.C.

Lieut. J. H. Brink, R.F.A., attd. R.F.C.

Capt. C. R. Cox, R. Sussex, attd. R.F.C.

Wounded.

2nd Lieut. J. W. Baker, R.F.C.

2nd Lieut. F. G. Brockman, R.F.C.

2nd Lieut. J. H. Cooper, R.F.C.

2nd Lieut. E. T. Curling, London and R.F.C.

Lieut. C. Curtiss, R.F.C.

2nd Lieut. H. E. Davis, R.F.C.

2nd Lieut. E. C. E. Derwin, R.F.C.

2nd Lieut. J. E. de Watteville, Cameron Hrs. and R.F.C.

2nd Lieut. P. L. Goudie, R.F.C.

Capt. W. G. Goudie, R.A.M.C., attd. R.F.C.

2nd Lieut. E. R. Gunner, R.F.C.

Lieut. R. S. Heath, Welsh and R.F.C.

2nd Lieut. G. H. Jacob, R.F.C.

2nd Lieut. A. Lindley, R.F.C.

Lieut. A. C. Lutyens, M.C., R.F.A., attd. R.F.C.

2nd Lieut. F. St. V. Morris, Sherwood For., attd. R.F.C.

2nd Lieut. A. F. T. Ord, W. Yorks., attd. R.F.C.

2nd Lieut. P. B. Pattison, Highland L.I., attd. R.F.C.

Lieut. A. D. Pryor, Cambs. R. and R.F.C.

Lieut. F. G. Saunders, R.F.C.

Lieut. R. P. Sewell, K.O. Scot. Bor. and R.F.C.

Capt. F. L. J. Shirley, Yorks. and R.F.C.

2nd Lieut. J. R. Smith, R.F.C.

2nd Lieut. R. N. Smith, R.F.C.

2nd Lieut. F. J. E. Stafford, R.F.C.

Lieut. J. H. Thomas, Manchester, attd. R.F.C.

Lieut. G. C. Walker, A.S.C. and R.F.C.

22681 2nd Air-Mech. H. S. Clark, R.F.C.

3947 Flight-Sergt. E. P. Critchley, R.F.C.

35972 Sergt. J. F. Ridgway, R.F.C.

12384 2nd Air-Mech. W. T. Williams, R.F.C.

Previously reported Missing, now reported Wounded.

2nd Lieut. S. Cooper, R.F.C.

2nd Lieut. E. B. Smyth, R.F.C.

Wounded—Shell-Shock.

41610 2nd Air-Mech. C. Chesson, R.F.C.

Missing.

2nd Lieut. R. E. Adeney, R. W. Surrey, attd. R.F.C.

Capt. A. F. Baker, Duke of Cornwall's L.I., attd. R.F.C.

2nd Lieut. A. H. Bates, R.F.C.

Lieut. A. Binnie, R. Scots Fus., attd. R.F.C.

2nd Lieut. C. B. Boughton, Welsh, attd. R.F.C.

2nd Lieut. P. B. Boyd, Gor. Hrs., attd. R.F.C.

2nd Lieut. G. N. Brockhurst, R.F.C.

Lieut. L. H. Cattle, Yeo. and R.F.C.

Lieut. E. W. Capper, Yeo. and R.F.C.

Lieut. W. J. Chalk, Can. Inf., attd. R.F.C.

2nd Lieut. L. C. Chapman, R.F.C.

2nd Lieut. J. H. Cock, R.F.C.

2nd Lieut. W. B. Cramb, A. and S. Hdrs., attd. R.F.C.

Lieut. H. R. Davies, R.E., attd. R.F.C.

2nd Lieut. H. Davis, E. Yorks, attd. R.F.C.

2nd Lieut. E. T. Dunford, R.F.C.

2nd Lieut. A. J. E. Etches, R.F.C.

2nd Lieut. G. W. Gillespie, Middlesex and R.F.C.

2nd Lieut. F. B. Goodison, S. Staff. and R.F.C.

Lieut. W. H. Green, King's (Liverpool) and R.F.C.

Lieut. W. Harle, N'umberland. F. and R.F.C.

Capt. G. B. Hodgson, R.F.C.

2nd Lieut. C. B. Holland, R.F.C.

Lieut. C. W. D. Holmes, Bedfordshire, attd. R.F.C.

2nd Lieut. H. G. M. Horne, London and R.F.C.

Lieut. F. L. Kitchin, Gloucester, attd. R.F.C.

2nd Lieut. E. R. Law, R.F.C.

2nd Lieut. R. A. Logan, R.F.C.

2nd Lieut. L. G. Lovell, R.F.C.

2nd Lieut. K. I. Mackenzie, A. and S. Hdrs., attd. R.F.C.

2nd Lieut. T. Margerison, Cyclist Batt. and R.F.C.

2nd Lieut. F. Matthews, R.F.C.

Lieut. O. D. Maxted, Buifs (E. Kent) and R.F.C.

Lieut. C. H. Morris, R. Welsh Fus., attd. R.F.C.

2nd Lieut. A. Ormerod, R.F.A., attd. R.F.C.

2nd Lieut. T. J. Owen, R.F.C.

2nd Lieut. E. J. Pascoe, R.F.C.

Capt. L. S. Platt, Lancers, attd. R.F.C.

2nd Lieut. P. O. Ray, Black Watch, attd. R.F.C.

Capt. L. L. Richardson, R.F.C.

2nd Lieut. S. Roche, R.F.C.

Lieut. W. O. Russell, N. Staffs., attd. R.F.C.

Lieut. J. R. Samuel, Welsh and R.F.C.

Lieut. R. T. B. Schreiber, Suffolk and R.F.C.

Capt. J. Stuart, R. Inniskilling Fus., attd. R.F.C.

2nd Lieut. A. H. Tanfield, R. Warwick., attd. R.F.C.

Capt. D. M. Tidmarsh, M.C., R. Irish., attd. R.F.C.

Lieut. A. Todd, M.C., Durham L.I., attd. R.F.C.

2nd Lieut. M. Topham, R.F.C.

Lieut. O. T. Walton, S. Lancs and R.F.C.

2nd Lieut. A. Watson, R.F.C.

2nd Lieut. B. W. White, King's (Liverpool R.), attd. R.F.C.

Lieut. M. H. Wood, Lincoln. and R.F.C.

2nd Lieut. D. C. Woollen, R.F.C.

2nd Lieut. R. S. L. Worsley, R.F.C.

1054 Flight-Sergt. A. G. Shepherd, R.F.C.

Previously reported Missing, now reported

Prisoners of War in German hands.

Capt. A. P. V. Daly, Connaught R., attd. R.F.C.

Reported Prisoner of War in German hands.

Capt. H. G. Southon, R.F.C.

Corrections:

Missing.

2nd Lieut. A. N. Lecker, R.F.C., should read Leckler.

Wounded.

2nd Lieut. W. W. Glinn, R.F.A., attd. R.F.C., should read Glenn.

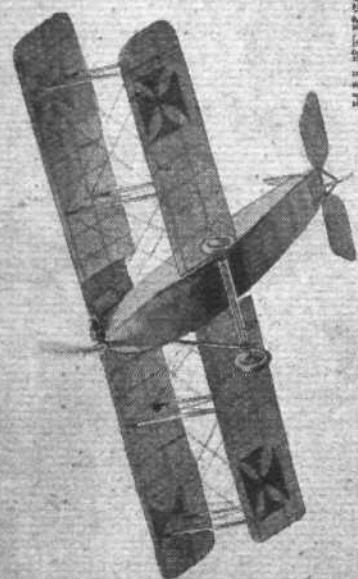
French Aviators Praise British Air Work.

ACCORDING to the special correspondent of the Havas Agency at the British front, the French Aviation Corps at the front has sent to General Trenchard the following expression of its admiration of the British flying officers:—

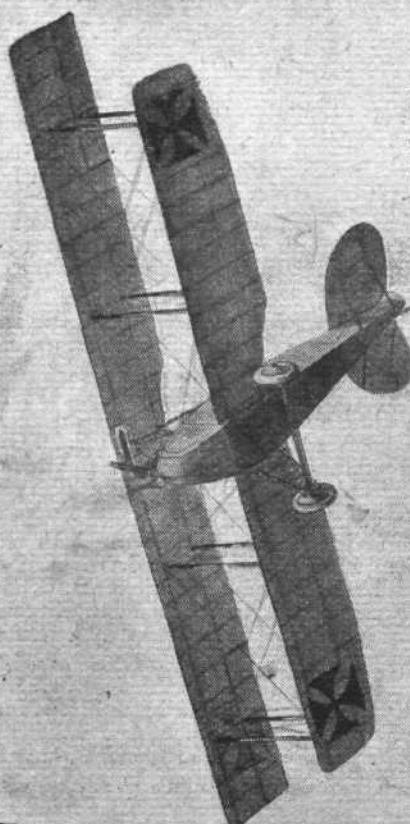
"French aviators congratulate their British comrades on their superiority over their adversaries, which they have never ceased to retain during the recent engagements. They

thank them for enabling French aviators to obtain the splendid success recently by giving them their generous aid. They declare that, amazed as they are by the exploits of the British airmen, they will be inspired by the same principles, and will make it their ambition to apply the same methods to French aviation."

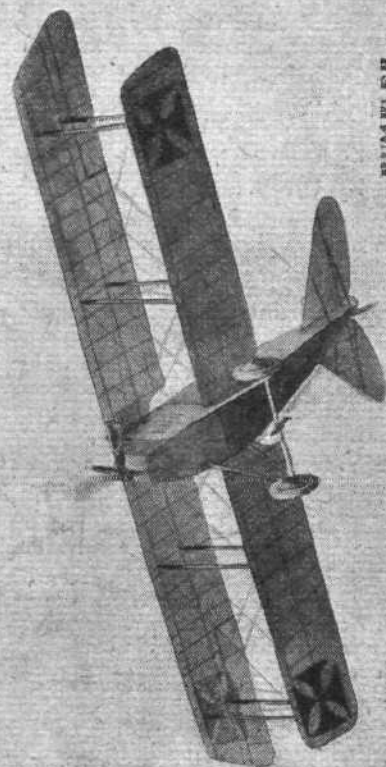
It is now confirmed, adds the correspondent, that the losses of the German Aviation Corps during the last few days were double those of the Allies.



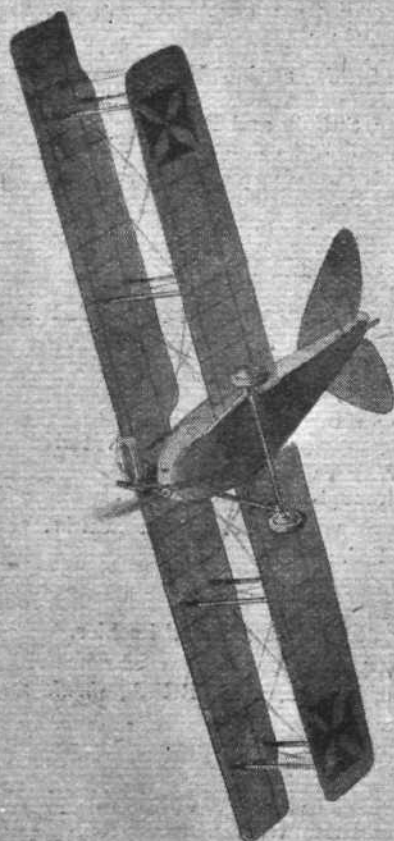
HALBERSTADT



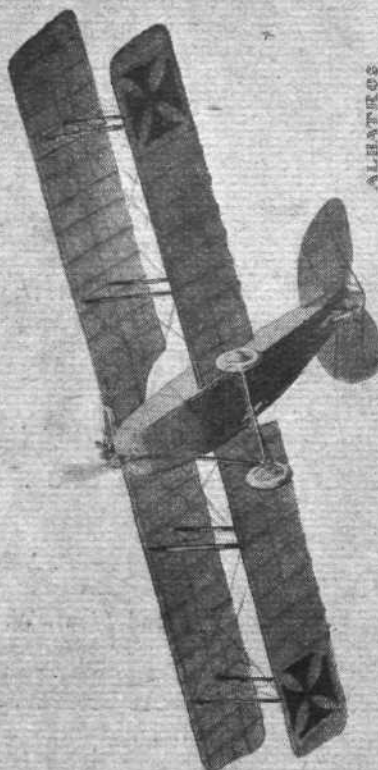
AVIATIK



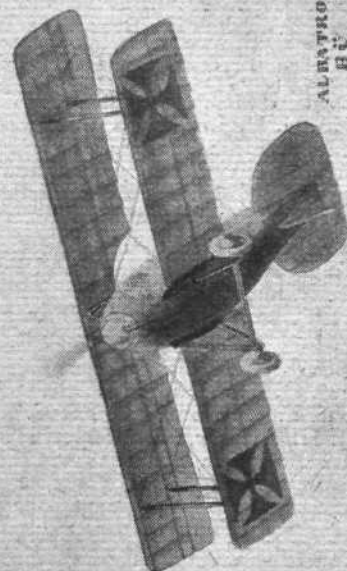
RUMPLER



L.V.G.



ALBATROS
C.III.



ALBATROS
B.U.

IDENTIFICATION OF GERMAN AEROPLANES.

(COPYRIGHT.)

(Continued from page 368.)

IN our last issue we published sketches of six different German aeroplanes, all shown from the same point of view, *i.e.*, three-quarter rear from below. This week the series is continued with the same machines from a different point of view. The reason for illustrating the various machines all in the same attitude is, as was pointed out last week, that by so doing comparison is facilitated. Later on, when the machines have been illustrated in what appears to us to be a sufficient number of attitudes we may collate the different sets in groups showing each machine in its different attitudes, thereby illustrating, not so much the differences between the various machines, but all the special features of each.

From the views published this week it will be seen that such features as dihedral angle and backswept or, as the Americans call them, retreating wings, do not appear to be of much help for identification purposes, since some machines possess one feature, some the other, and some both or neither, and it will often be found impossible to determine whether the slope of a wing is due to one or the other. The relative size of the machines is, as before, well brought out in this view, as are also such distinctive features as the overhang of the top planes, the shape of the wing tips—whether raked, straight, or rounded—and the form of the *ailerons*.

A further peculiarity which may be helpful, and which is emphasised in this set as well as in that published last week, is the size and shape of the cut-out portions of the trailing edge of the wings. Thus it will be noticed that in the Halberstadt the opening in the top plane is of rectangular shape, while the lower planes have not been cut away near the body.

In the Albatros Bü the trailing edge of the lower planes also runs right up to the sides of the body, but the top plane has a wide semi-circular portion cut away. Of the four larger machines the L.V.G. is the only one that does not have the trailing edges of the lower wings cut away near the body, and the opening in the top wing is quite small. The other machines have both upper and lower wings cut in varying degree, the size and shape of the cut-away portions being clearly indicated in the illustrations.

While the shape of the tail formed such a distinctive feature in the view published last week, this is less apparent, although still quite useful, in the present set. What is, however, most clearly shown in this view is the shape of the body in front. Thus it will be observed that the Rumpler and Aviatik have a very pointed nose, the Halberstadt is slightly less pointed, the L.V.G. and Albatros are much wider and more rounded, while the Albatros Bü is of circular section in the nose, and has a hemispherical nose piece over the propeller boss. Other distinctive points will readily be discovered after an examination of the illustrations, which, we think, speak for themselves.

The following table gives the approximate dimensions of the various machines:—

Name of Machine.	Span.			Chord.	Length.
	Top. ft. in.	Bot. ft. in.	Gap. ft. in.		O.A. ft. in.
Albatros C. III..	39 2	37 3	5 3	6 1	26 4
Albatros Bü. ..	28 4	26 9	5 3	5 9	24 0
Aviatik ..	41 0	35 4	6 4	6 1	26 3
Halberstadt ..	28 6	26 0	4 6	5 0	24 0
L.V.G. ..	42 10	37 10	5 6	5 10	27 0
Rumpler ..	40 10	36 10	5 9	5 6	26 4

The Reprisal Air Raid.

A MESSAGE from Berlin sent through wireless stations of the German Government on April 16th, and intercepted by the Admiralty, per Wireless Press, stated:—

"On April 14th, at noon, a hostile squadron composed of 12 aeroplanes attacked the open town of Freiburg. The attack was repeated at five p.m. by two more squadrons, with altogether 23 machines. Several human lives were sacrificed to this iniquitous attack; seven women, three men, and one soldier were killed; 17 women, eight men, and two children were wounded. The hostile flyers also aimed at the new theatre, the university, and the clinics. The anatomy section was considerably damaged. The attack was not fully carried out, thanks to our efficient counter-measures. During air combats with our defensive flyers two hostile machines were shot down near Schletstadt and Markirch. A third fell down in air combat with the assistance of anti-aircraft guns. It is characteristic that the three machines brought down were British, with British crews.

"The commander of the attack, a British Lieut.-Colonel, fell into our hands. According to his declaration and to the text of a pamphlet dropped, the attack was a reprisal for the torpedoing of the 'Gloucester Castle.' The justification of such a foundation is most categorically contested. Our Government communicated in time to England that the plying of so-called hospital ships could not be further tolerated within the exactly delineated zone. If the British nevertheless do not heed our warning and misuse the Red Cross and undertake transports in the barred zone, they must bear the consequences of their proceeding. It is cheap glory to attack open towns for vengeance. At Freiburg there are no objects of military importance which could justify this attack, which is thus a worthy successor of other attacks against defenceless villages in southern Germany, which are not justified by anything, and are a sad paragon (*sic*) (? counterpart) to the assassination of children at Karlsruhe on June 22nd last year."

"The Properties of Aerofoils and Aerodynamic Bodies."

UNDER this title Mr. A. W. Judge has written a volume, which forms a companion to his "The Design of Aeroplanes," but which is, nevertheless, complete in itself to the extent indicated by its title. The merits of Mr. Judge's latest volume do not so much lie in any great originality or addition to present-day knowledge, as in the fact that he has collected and arranged in convenient form all the more important data already available on the subject of wing sections, bodies and struts. Extensive use has been made of the results published by the Advisory Committee for Aeronautics, and by Mons. G. Eiffel. Although these works are, of course, well known to those who have made a long study of aeronautics, there can be little doubt the rapidly increasing number of more recent students are not so familiar with them, and have in many instances found some difficulty in collating the various experiments, due chiefly to the different units employed in recording the results. Also, Eiffel's latest books have not yet been translated into English, a fact which, added to the difficulties of following with the desired closeness the expressions in metric units, may have prevented many students from making full use of the wealth of information contained in these excellent works. It is to these that Mr. Judge's latest book will especially appeal, as the author has converted Eiffel's results into the "absolute" coefficients employed by the National Physical Laboratory, thus making comparison of results obtained at the two institutions considerably simpler. A point which should help to recommend the book to those just taking up the study of aeronautics is that the mathematical side of the subject, although the theory of the cambered plane and the principle of aerodynamic similarity have been touched upon, has been kept very brief, and is so simply treated that anyone with a reasonably good education will have no difficulty in following it. The book, which is published by Whittaker and Co., is obtainable from the Offices of "FLIGHT." The price is 15s. 6d. post free.

MORE NOTES FROM PARIS.

By DOUGLAS W. THORBURN.

La Guerre Aérienne.—The popular illustrated weekly dealing with French aviation is *La Guerre Aérienne*. It was founded in November last by its *redacteur en chef*, M. Jacques Mortane, and rapidly established itself as an interesting and informative journal. It deals more particularly with the personal aspect of aviation, and its features include many articles by well-known pilots, as well as excellently reproduced portraits and other illustrations. M. Mortane has been a keen student of aerial progress since 1909, and is a recognised authority, especially on military aeronautics. He has written numerous articles for the leading French newspapers and magazines, and is the author of several books on the subject. One cannot talk to him for long without discovering, as I did, that he is an enthusiastic admirer of British pilots and British machines. Bearing in mind the countless difficulties under which a journal of this kind is published during war time, *La Guerre Aérienne* is a most creditable production, on which M. Mortane and his staff deserve to be heartily congratulated.

Some French Aerodromes.—Being the fortunate possessor of an official pass authorising me to enter any French aerodrome, except those in the actual war zone, I had exceptional opportunities for seeing how things are done over there as compared with our own methods at home. However, if I described all my impressions and observations in detail, as I should like to do, I shudder to think what the probable consequences would be to me, and no doubt the Editor of "FLIGHT" would shudder on his own behalf too. Most of the interesting experiences, therefore, must remain untold, at any rate for the present. Of those things which may be mentioned, I was struck by the fact that each of the aerodromes I visited was guarded by Franco-Chinese soldiers—quaint little yellow fellows to look upon, but most useful in keeping the grounds in order and cleaning and moving the machines about. When I first encountered them, in their Eastern uniform, I asked where they came from, and was told they were "Ammonites." My knowledge of prehistoric affairs is very slight, though I have often listened to the jokes of revue comedians, but I had an impression that an ammonite was some kind of fossil, and it seems more probable that these are Anamites. In passing, it is worth recording that the whole of the streets of Paris are cleaned by natives of another French colony, and it seems strange that no use is being made at home of our immense resources in the way of native labour. After seeing this object-lesson in France, which appears to be a big success, I am not without hope that we may before long ease our very serious labour shortage by similar means.

Damaged Goods.—By far the most interesting aerodrome to me was one to which all the wrecked machines are sent straight from the front. A railway line runs into this aerodrome, and it is quite thrilling to see whole train-loads of wreckage coming in, and to examine the machines and pieces as they are unloaded and sorted out. Every kind of aeroplane imaginable is there—some of them barely recognisable. Engines severely battered, which have been buried deeply in mud; planes which have been torn and riddled with shrapnel; *nacelles* crushed into a shapeless mass and leaving little room for doubt as to the fate of the unfortunate pilot; petrol tanks crumpled as one would crumple a paper bag in the hand; and charred frames which represent all that remains of some fighting machine which has met with a terrible end—all combine to form an unforgettable picture. There was something weird and fascinating about it, and one could spend hours wandering among these evidences of the tragic side of aerial warfare. But what impressed me most of all was the system by which the great quantity of debris was sorted carefully into its component parts. Nothing was wasted. Everything was classified, under the supervision of French officers, and then stored in its proper department by the natives from the Franco-Chinese colony. In one place was a huge pile of planes, in another were all the engines, in a third a heap of rubber tyres as

high as a two-storied house, and so on. Why is it that at home one hears of damaged machines being ruthlessly piled on to bonfires? I have been informed on good authority that bonfires of this kind are the custom at a certain R.N.A.S. station. The whole machine is destroyed, although it may include valuable fittings and instruments which are in perfect condition, and sometimes the completeness of the conflagration is ensured by soaking everything in many gallons of petrol. If true this is a scandalous proceeding for which there can be no excuse, and there should be an immediate investigation. But the French were always a more frugal nation.

A Little Looping.—There is an old story, which may be new to some of my readers, of a man who was sent to take an inventory of the furniture and contents of a certain house. Unfortunately there happened to be a bottle of whisky on the sideboard, and this somewhat hindered his work, for later in the day he was found asleep under the table, with the empty bottle on one side of him, and on the other a notebook containing the solitary entry:—

"1 revolving carpet."

I can now sympathise with the feelings of that man, though I hasten to add from an entirely different cause. At a certain aerodrome not far from Paris I was introduced to a well-known pilot of much experience, who offered to take me for a flight. He said nothing about looping, and I did not mention the fact that I had already looped with various aviators on various types of machines, but apparently, while I was engaged in a desperate struggle with a fur-lined flying suit, someone gave him some private and confidential instructions which I did not hear. And I know who did it, too! It was a day of frequent snow-storms and a strong wind, but the machine—a twin-engined Caudron, fitted with a Sperry Automatic Pilot—climbed rapidly and rode through the storms with wonderful steadiness. After the first few minutes the human pilot switched on the automatic control, and the manner in which the machine stabilised itself was amazing. I have always looked on the gyroscopic principle with great respect, but the ingenious manner in which it has been utilised by the Sperry Company is something which every pilot ought to see and to test for himself. This, however, is a subject which deserves an article to itself. After a short time we found ourselves 3,000 feet over the famous Palace at Versailles, and I was charmed with the view. One would almost think that the palace and park had been laid out solely with an eye to the effect as seen from the air. Its broad straight avenues, stately courtyards, and ornamental fountains and lakes amid the trees looked exactly like some wonderful carpet pattern. Suddenly, without a word of warning, while I was comfortably admiring the scene, the machine stood on its nose and commenced a vertical dive. I smelt a loop, as one might say, and ought not to have minded, but being taken completely by surprise I involuntarily looked down at the floor to avoid the spectacle of the earth going over my head. This only added to the effect of the thrill, for between my feet was a large square hole intended for a camera to be fitted, and in consequence I saw through it blue sky and fleecy clouds whirling beneath me. It was most disturbing, and when we came back into a normal position I looked around at my pilot, more in sorrow than in anger. He smiled a wicked smile at me and looped again, and then went one better and did two more horrid loops sideways. These were the most confusing movements I have ever experienced in the air, and I am not quite sure even to this day how he did them. After the first loop I looked over the side all the time, and as I saw the pattern of the wonderful park at Versailles whizzing over my head and round my neck and disappearing down my back, I should like to have taken out a note-book and written down the one item:—

"1 revolving carpet."

But I did not think of it until afterwards.



President Wilson's Speech for the Germans.

FROM to-day, writes the *Daily Telegraph* Paris correspondent on Monday, French, British, Belgian, and American aviators have begun to scatter over the German lines the half million copies of President Wilson's address to Congress of April 2nd last declaring a state of war with Germany. It has been translated into German at the American Embassy here,

and printed at the Imprimerie Nationale for the *New York World*. It gives, of course, the whole text of Mr. Wilson's address, but those parts which have been already published in Germany are printed in black, and those which have hitherto been suppressed in Germany are printed in red ink. A perusal of the pamphlet shows at once that nearly three-fifths of Mr. Wilson's address was suppressed in Germany.

ANSWERS TO CORRESPONDENTS

[As a number of letters reach us signed with initials only, some of which do not give a complete address, we would point out that such communications cannot be dealt with in our columns. Full name and address, which will not be published, must always be given.—Ed.]

Notice to Correspondents in General.

Applications for commissions in the Royal Naval Air Service should be addressed to the Director of Air Services, Admiralty, S.W. The necessary form and conditions of entry can be obtained from the Secretary of the Admiralty.

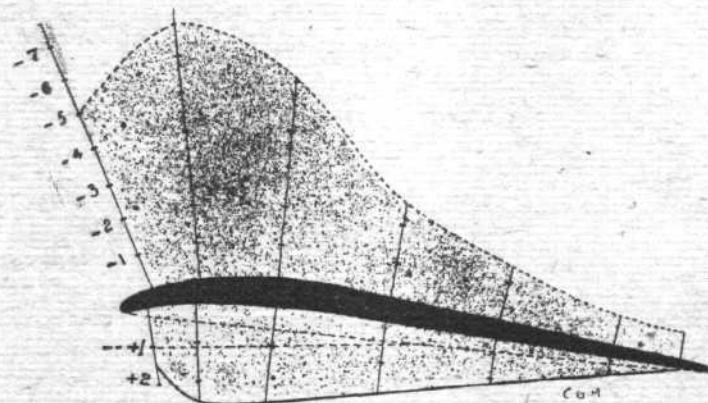
Applications for commissions in the Royal Flying Corps should be sent to the Director-General of Military Aeronautics, Hotel Cecil, Strand, W.C.

Those who wish to enlist in the R.N.A.S. should apply to the nearest naval recruiting station or to the R.N.A.S. Drafting Office, Crystal Palace, S.E. Skilled mechanics are taken whatever their army classification, but unskilled men are only taken if they are classified B1, B2, or C1.

For enlistment in the R.F.C. apply to Major Mitchell, the Polytechnic, Regent Street, W. Men who are classed B1 or B2 are wanted as armourers, acetylene welders, carpenters, coppersmiths, motor transport drivers, electricians, engineer fitters, watchmakers, instrument repairers, wireless telegraphy, cabinet makers as riggers, tailors as sail-makers, vulcanisers, petrol winch drivers, fitters. Unskilled B1 and B2 men are also wanted for the balloon party and labour section and C2 or C3 men who are tailors and shoe-makers. Motor cyclists if with good eyesight are also accepted.

C. G. M. (Rochester).

When an aerofoil is supporting a load in flight, eddies of a cyclic character are formed about the front edge of the wings, and cause the relative wind to approach with an upward trend. Where the air stream divides in contact with the leading edge of the wing, especially high forces ordinarily prevail. In the accompanying diagram of a wing



section the forces acting on the wing are shown. It will be noticed that the forces above the wing indicate negative pressure or suction, while those below the wing denote positive pressures. The forces are the static pressures at the surface of the plane at any point, and they are measured by the

length of the ordinates drawn normal to the tangent of the surface at any point. Near the leading edge these ordinates have a forward slope, which indicates that a forward pull is being exerted by the air at this point. Further back the ordinates are approximately at right angles to the chord line, while near the trailing edge they have a backward slope. The resultant of all these forces, on account of the fact that the forces near the leading edge, where the ordinates slope forward, are greater than those near the trailing edge which slope back, therefore forms an angle forward with the force measured perpendicular to the chord. Thus the lift itself is not only increased but the resistance is simultaneously reduced. This resultant, although tilted forward from the perpendicular to the chord, is, of course, still inclined backwards from the vertical. It is split up into two components, one acting vertically as the lift, the other horizontally as the resistance, which has to be overcome by the thrust of the propeller.

F. W. L. (Kent).

The machines are: A, B.E. 2E, and B, B.E. 12. The tank under the wings in the machine you refer to is the petrol service tank.

C. E. F. (Ashford).

So far no distinguishing mark has been announced, but some of the U.S. Navy seaplanes have an anchor (inclined) painted on their rudders.

"Brum" (Oxford).

We do not think you could obtain permission to effect a transfer at the present time.

G. W. K. (Purley).

The F.A.I. certificate, as far as Great Britain is concerned, is usually known as the Royal Aero Club's pilot's certificate, and you can obtain full particulars from the Club at 3, Clifford Street, New Bond Street, W.

A. M. (Oxford).

There are chapters on bats, flying fishes and dragon-flies in Dr. Hakin's book "Animal Flight," published by Iliffe's at 12s. 6d. There was a discussion on insect flight in "FLIGHT" for June 3rd, 1917, and subsequent issues.

C. C. W. (Tilbury).

We are much interested in the photograph of your model, which we hope to use soon.

J. S. U. (Selby).

You should write to the Directorate of Military Aeronautics, Hotel Cecil, W.C., for a definite answer to your query.

W. W. R. (Prescot).

1. No. 2. See notice above. 3. It depends upon your qualifications. 4. Yes.

E. G. (Westcliff).

The pay is the same as for an infantry private, and many have to live on it.

P. H. (Bournemouth).

Both mean the same thing, that the officers are seconded from their regiment. Those who have only R.F.C. after their name have been specially entered in the R.F.C., and not seconded from regiments or other units in the Army.

Another Aeroplane from the Gold Coast.

THE Government of the Gold Coast has received from the Aborigines' Rights Protection Society a further sum of £1,500, which has been subscribed locally for the purchase of a second aeroplane to be presented to the Royal Flying Corps.

German Machine in Switzerland.

A GERMAN aeroplane fell to earth near Dottingen last week, the machine and its occupants being seized by the Swiss authorities. Another German aeroplane which flew over Rheinfelden and Stein was fired upon by Swiss soldiers.

"In the R.N.A.S."

THE war letters of the late Flight-Lieut. Harold Rosher, R.N., have already won appreciation from a large circle of

readers, but that circle will be greatly extended now that Messrs. Chatto and Windus have issued an edition in paper covers at one shilling. Written without any thought of publication, the letters are brimful of incident, and give a very vivid picture of the life in the Royal Naval Air Service from the time when the late Mr. Rosher joined in August, 1914, till three days before his death when testing a machine on February 27th, 1916. He took part in several big raids, and many of his letters refer to his exploits in this connection. The new edition contains the introduction by Mr. Arnold Bennett, and a number of interesting photographs. A thoroughly good shilling's worth, and, as in the case of the 3s. 6d. edition, the proceeds are divided between the Flying Services Fund and the R.N.A.S. Comforts Fund.

LEEDS' GIFT TO INDIA.

THE battleplane which has been subscribed for by the Leeds Chamber of Commerce and presented to India, was formally handed over at Roundhay Park on Saturday afternoon. The machine, of the latest type, has been built locally, and is to be used on the western front. At the luncheon, Lord Desborough, in proposing the toast of "India and the Imperial Air Fleet," referred to what he described as "the carping, ill-founded, and mischievous criticism passed on the Air Service at the front." It was depressing to both officers and men concerned. We know our young men there, and they are doing splendidly.

Lord Islington, Under Secretary for India, in acknowledging the toast, said the gift testified to the desire of the people of Leeds to assist India in her continued and consistent co-operation in the effective prosecution of the war. The war had shown that an efficient Air Service was indispensable to our military and naval success, and they could scarcely set any limit to the extended purposes to which flying might be put in the years to come. It was quite certain that a widely developed air organisation would play an essential part in the defence system of India. That was particularly so in regard to the North-West Frontier, which, peopled by a host of marauding tribes, had always caused anxiety to the Government of India. We had had constant and vehement criticisms of the flying service at the front, and especially so in connection with the losses we had sustained. Our losses had undoubtedly been heavy, and we all deeply deplored them, but it would require a more intimate knowledge on the part of critics to say that these had been excessive, if their verdict was to be accepted by their fellow countrymen. He believed those who were properly informed would tell them that our present splendid success on our line in France, in co-operation with our gallant Allies the French, had been in no small measure, indeed in large measure, due to the effective organisation and magnificent personnel of our air fleet. Losses must occur, but if we compared our losses in the air with our losses in previous wars that were sustained by our reconnaissance organisation of those days, the cavalry screen, we should find that in point of numbers our losses were considerably less, while the results in point of detailed, accurate, and minute information were from 50 to 100 per cent. better.

Sir David Henderson said it was courage that put us into the war, and it was courage that was going to carry us through. Fortitude was needed at the present time. Fortitude meant the capacity for looking on the bright side without boasting and the black side without depression. Referring to the officers and men of the R.F.C., Sir David said:—"I will tell you now that these young flying men are the salt of the earth. They had to take very serious risks and suffer very serious losses in order to enable somebody else to make a

success. They had never been found wanting, and had never hesitated. They would go on facing their losses and doing their work as long as the war lasted."



General Sir David Henderson, upon the occasion of his visit to Leeds last week, presented Sergeant Dean, R.F.C., with the M.M. for bravery in France.



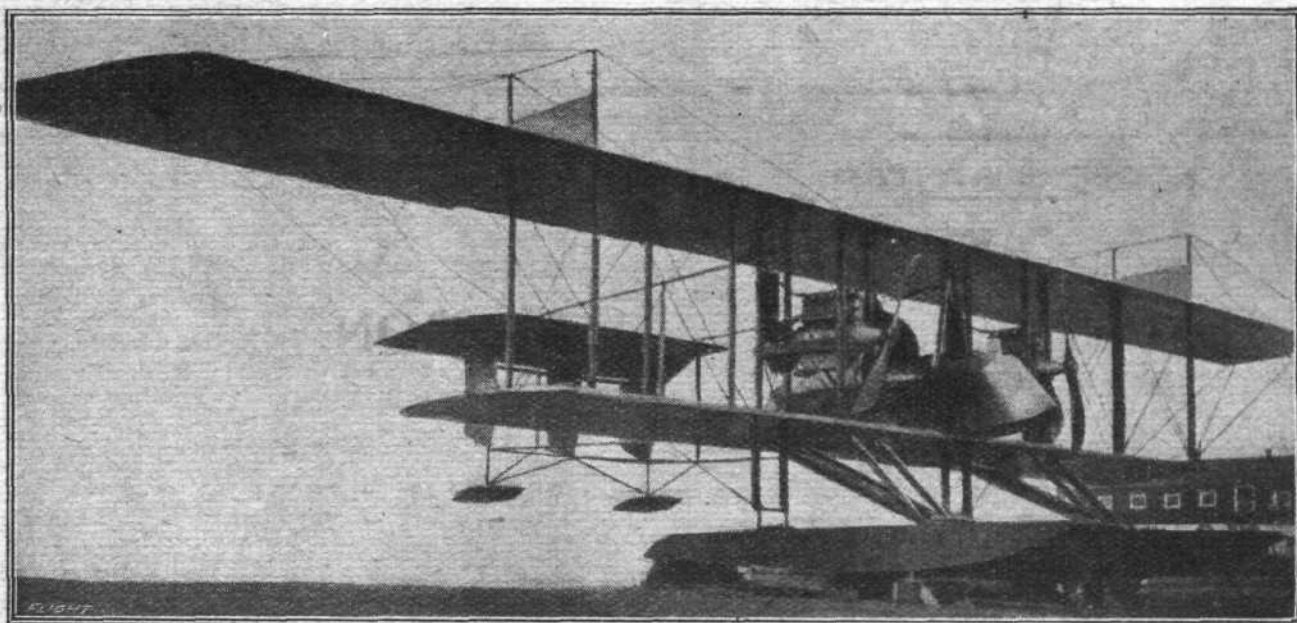
The presentation of an aeroplane to India by the City of Leeds. Lord Desborough after his flight.

AIRISMS

FROM THE FOUR Winds.

THE "Kadaver" Kulturists, Kaiser Wilhelm II and Prince Henry of Prussia, have promptly and rightly been struck off the list of honorary members of the New York Yacht Club.

little doubt that the vote for the Air Board which comes on this week will give the opportunity for pretty open discussion of matters pertaining to the administration of the Air Services,

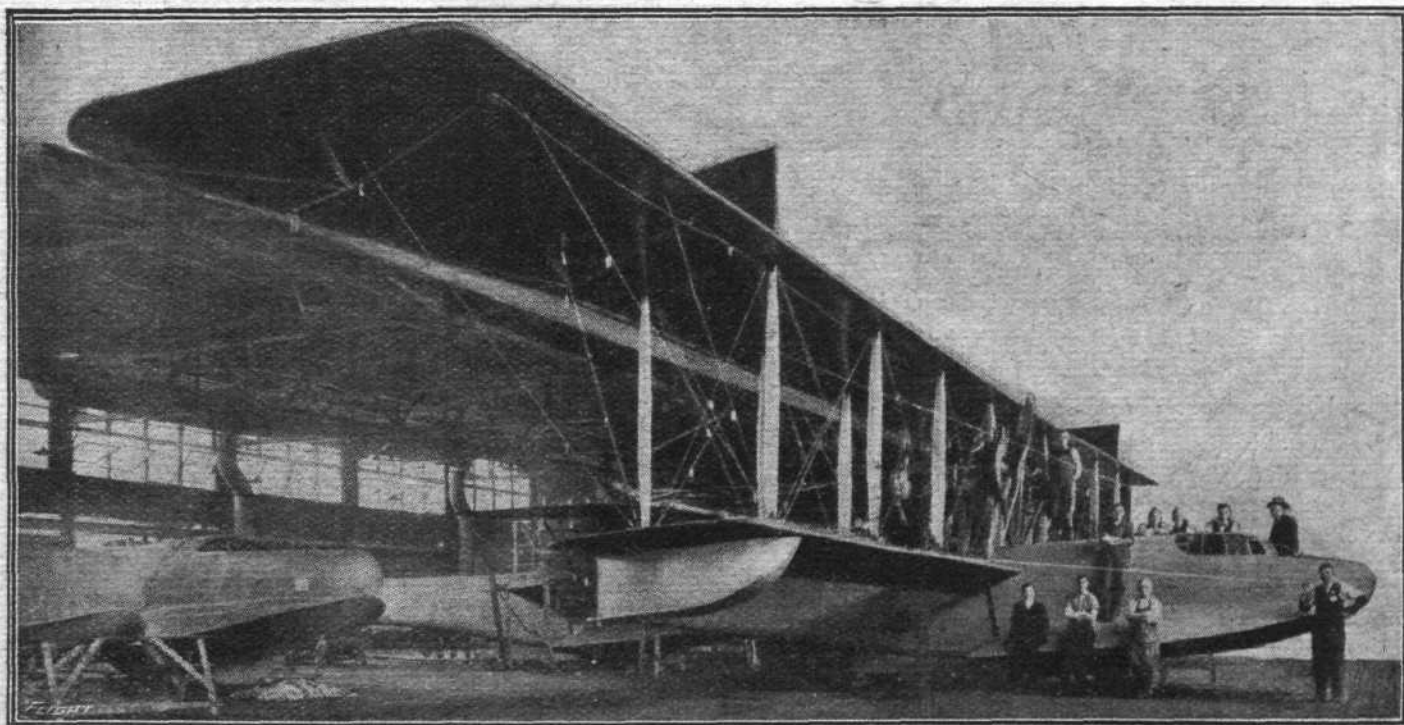


A large twin-engine seaplane built by the New York Aero Construction Co. The planes measure 73 ft. and 44 ft. span, 7 ft. 6 ins. and 6 ft. 6 ins. chord top and bottom respectively. The engines are two 100 h.p. Hall-Scott 7-A models.

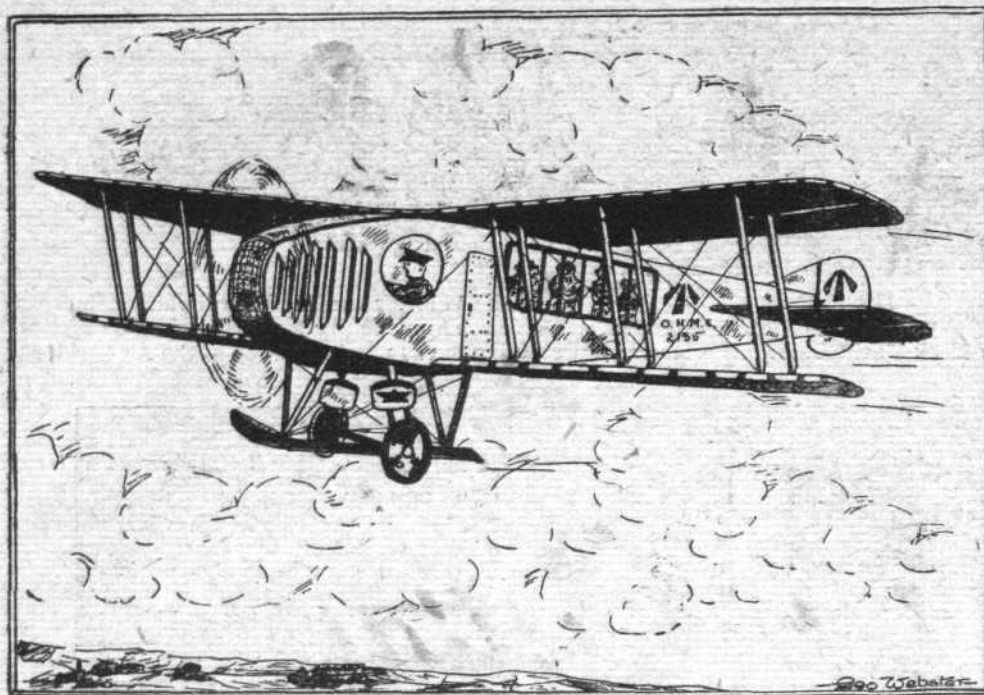
A VERY powerful section of the two Houses is now joined to the Parliamentary Air Committee, the supporting members of the Commons totalling 40, and in the Lords there are 28 adherents. Quite a number of the other members are also sympathetic in their views, although they for the time being are not active members of the Air Committee. There is

and it is to be hoped criticism will not be all focussed upon the R.F.C. There is another branch of the Air Service badly needing attention.

By way of a preliminary, and so as to clear the ground as to the directions in which adverse comment is *not* intended, a



One of the large Curtiss H-12 flying boats, which has a wing spread of 92 ft. 8½ ins., an overall length of 46 ft. 5½ ins., and weighs 5,945 lbs. The power plant consists of two 200 h.p. VX-3 Curtiss motors, and the speed is in the neighbourhood of 85 m.p.h.



"Types of aeroplane we may build after the war. Flying prison van." (From the *Avro House Journal*, the "Joy-Stick.")

batch of four resolutions was at the end of last week passed at a gathering of the Air Committee, over which Mr. Joynson-Hicks, M.P., presided, to the following effect:—

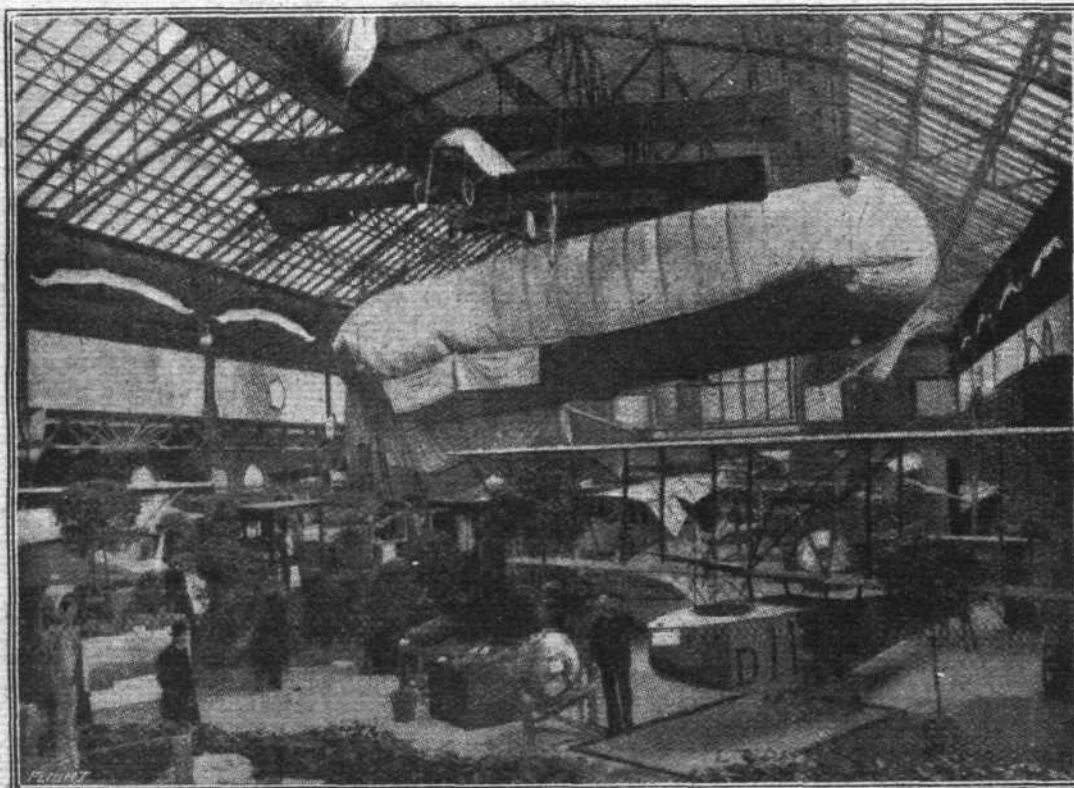
"1. That this Committee desires to place on record its pride in the splendid work of our airmen on the Western Front, and to congratulate them on the share they have taken in the defeat of the Germans in the recent fighting.

"2. That this Committee desires to congratulate the Government on the air attacks they have made on German towns by way of reprisal for the dastardly crime of torpedoing Red Cross transports, and trusts that this policy will be further carried out whenever Germany is guilty of similar breaches of the law of nations.

"3. That this Committee requests Lord Cowdray kindly to meet it, with a view to discussing in confidence the present position and prospects of the Air Service, and at the same time desires that the meeting should be open to any member of either House of Parliament who may desire to attend it.

"4. That this Committee expresses the hope that the Government will arrange for an early debate on the Air Estimates."

It is to be hoped the House discussion, whether in private session or otherwise, will be a well-balanced statement of facts, and not merely a sweeping and wide general charge of all-round shortcomings. A pound of fact, well substantiated, is worth several tons of verbose frothing, with no backing of evidence. That there have been serious shortcomings in initiative of the right character, there can be no manner of doubt, any more than that our pilots will cheerfully take any number of chances and are far and away as good as the world can boast. But however much the latter fact is rubbed in by reiteration, the initial trouble of want of foresight is not varied one iota. To the contrary. It only makes it the more patent that with the same ratio in the past in administrative initiative as in our pilots' pluck and enterprise, the Hun flyers would never have had so much as a look in against our men. That matters are now mending in the right direction we have every confidence, but provision should be ensured against a lapse to slacking off in official efforts to always go one better than that which may already have been achieved. The finish of the war this year or its continuance into 1918 rests in a very large measure upon the immediate supply



A general view of the German Aeronautical Exhibition of War Booty, to which reference has been previously made in "FLIGHT."

of the right engines and machines in sufficient quantities. *Somebody* should have absolutely free executive power if any real benefit is to come out of the magnificent aeroplane industry. There are at present too many official chefs who insist upon *their* recipes being the only solution to clarifying the cloudy hash in which the air service administration has become involved.

UPON their visit on Thursday last week to the Sopwith Aircraft Factory, the King and Queen must have had a great

tour of the works with a visit to Brooklands Aerodrome, where active demonstration was given of the remarkable capabilities of the machines, replicas of which their Majesties had but a few minutes earlier seen passing through their various stages of construction, until they emerged from the factory to be tried out by the testers. The King's personal and increasing interest in aviation is a good augury for and puts the seal upon its future.

MR. J. STANLEY SMITH of Martinsdale, Montana, is "some" shepherd. Mr. Smith has a matter of 100,000 sheep, and according to the New York correspondent of the *Daily*



Brig.-Gen. George O. Squier, now Chief Signal Officer, U.S.A.



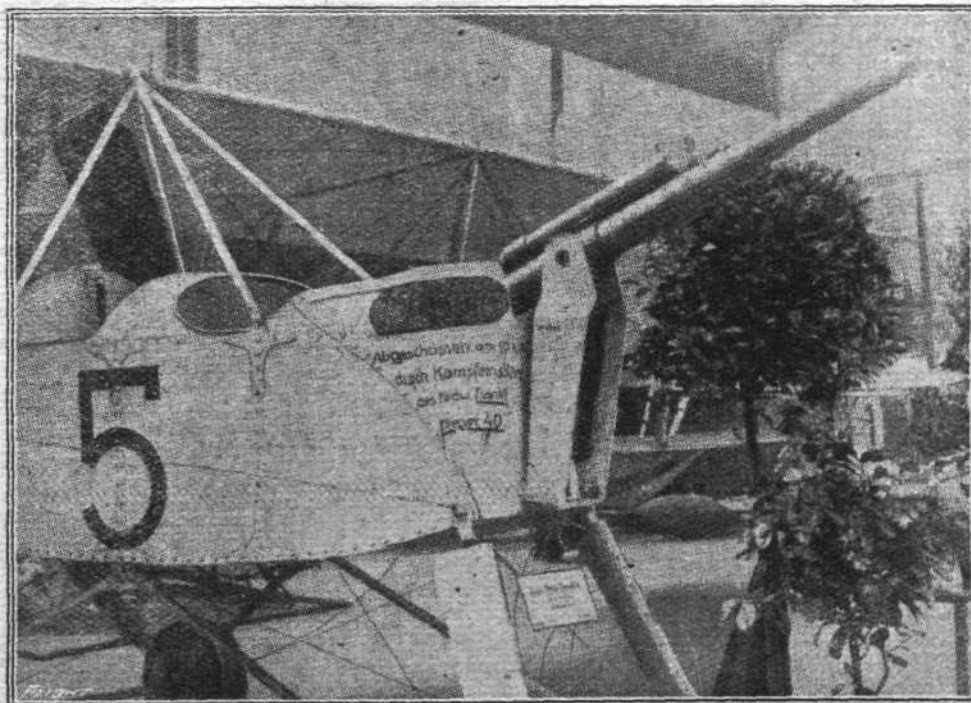
Mr. Clifford B. Prodger, America's best-known pilot in this country, carried out a special flight in honour of America's Day, last Friday, during which the American flag was prominent on the big British machine flown by Mr. Prodger.



Lieut.-Col. John B. Bennet, Officer in Charge, Aeronautic Division, Signal Corps, U.S.A.

object-lesson in the dilution of skilled labour with women. Piloted by Mr. T. O. M. Sopwith, the Chairman, (and with Mr. R. O. Cary, General Manager, and Mr. F. Sigrist, Works Manager, at hand, the tour of the shops occupied no less than an hour and a half. No less interest was shown by the Maharaja of Bikanir and Capt. Forbes Davidson, who accompanied King George and Queen Mary in the drive over from Windsor. A very happy finishing touch was given to the visit, by following up the

Express he has taken to an aeroplane in looking after his mutt-tons. Shepherd Smith claims that the motor car which he has hitherto used is a back number, as he can cover five times as much territory in a day on his new aeroplane mount. We don't doubt it, but, we will frankly confess, sheep farming by aeroplane is *not* one of the commercial undertakings for which we have in the past advocated the use of the aeroplane. The field for the airway of the future is evidently wider even than we have dared to picture it.



A captured French machine on view at the German Aeronautical Exhibition of War Booty.

On the other hand, it is an obvious antidote to submarine activities, that the mail service between the mainland of Italy and Sardinia should for the future be conducted by aeroplane instead of by ship as hitherto.

YET another instance of the singling out by the Germans of British air pilots for honour is to hand from Mr. Philip Gibbs in an account in the *Daily Telegraph* of a recent visit to the front west of St. Quentin. At one of the re-conquered little townlets, Mr. Gibbs noted that "outside in the churchyard there was a great tomb to the memory of French soldiers who fell in 1871, and next to them the graves of German soldiers killed in this war, and a wooden cross, where the French soldiers lay, to 2nd Lieutenant Nixon, of the Royal Flying Corps, killed here behind the German lines on July 19th, 1915."

Is the Royal Aero Club regaining some of the exuberance which characterised its earlier days in the old premises? One hears quite amusing stories of merry evenings and quaint episodes. We feel almost tempted to start a "Things-We-Want-To-Know" column. If we did we might lead off with something after this style:—

Who was the member who arrived at his country seat late at night with his face decorated in Futurist colours, and what did his wife say?

Who is the distinguished officer of exalted rank who has started to collect black moths?

And how did his beautiful moustache disappear in a night, and is it true that his pet terrier failed to recognise him next day and bit him?

But perhaps we had better not develop this kind of journalism after all.

"THROUGHOUT the day the most courageous and devoted co-operation was rendered to the Canadian Corps by a brigade and a squadron of the Royal Flying Corps." In these words the official Canadian War Records indent the glorious work of our flying men in that glorious achievement the storming of the Vimy Ridge—to the credit of the Canadian troops. It is a generous acknowledgment from one group of heroes of the brother hero's prowess.

THINGS the Editor of the *Joy Stick*, the smart little House Journal of the Avro firm, wants to see:—

A hair from the head of a hammer.

A plume from the wing of an Avro.

A bite from the teeth of a saw.

A wink from the eye of a needle.

And a page from a volume of steam.

VERY graceful were the evolutions of the aeroplanes which circled over the St. Paul's district on Friday last—America's Day—by way of adding interest to the Royal Service in the Cathedral. The height at which they flew gave little opportunity for "snapping," even had the press photographers not been harried about and bullied into the gutter by the police

around the Cathedral, presumably "according to plan"—R.F.C. plan—in order that the R.F.C. "professionals" might have full monopoly of pictures. But it's a funny game all the same, and is but an instance of officialdom run mad with swollen head begotten of opportunity. It is, indeed, another little R.F.C. scandal, of a minor character, it is true, but one that might well form the basis for an investigation.

A RECENT fro nispiece of the famous Bavarian satirical paper *Simplicissimus* is a vision of "Zeppelin in Heaven," by T. T. Heine, the well-known caricaturist. In this, as will be seen from our reproduction, the deceased count has evidently flown up to heaven in one of his air cruisers, which is seen resting



on the clouds in the background undergoing the inspection of a company of wondering angels.

St. Peter is seen addressing Zeppelin with the following words: "For the war hero and brilliant inventor the best place has been prepared. One can see Germany from it."

WONDER if the Count had any "Kadaver" shares, and if he managed to pass them on in time to meet St. Peter with a whitewashed conscience.

Fatal Accidents.

AN inquest was held at Leicester on April 12th on Lieut. J. A. Williamson, E. Kent Yeomanry, att'd. R.F.C., and Corporal C. M. Ryder, Australian Flying Corps, who were killed on the previous Tuesday. The machine was seen to enter a snow cloud and fell to the ground, but there was nothing to explain the cause of the accident, but a doctor suggested that the pilot might have fainted or become unconscious before the machine got out of control. A verdict of "Accidental Death" was returned.

Two R.F.C. officers, one of them Major W. Milne, M.C., Loyal N. Lancs., att'd. R.F.C., were killed in Berwickshire on April 13th. There was a sharp shower of snow at the time, and the aeroplane was seen to fall to the ground from a good height about two miles from a village. Assistance was immediately summoned by people who saw the accidents, but it was found that both officers had been instantaneously killed.

At an inquest on Prob. Flight Officer F. H. Y. Titcomb, R.N.A.S., who was fatally injured in the North of England in a flying accident on April 15th, a verdict of "Accidentally Killed" was returned.

On April 15th an aeroplane piloted by Lieut. G. Turnbull, R.F.C., was seen to foul some hedges at Crag Top, near Knaresborough, and then nose dive over the cliff into the river at Chappy Dam. No trace, however, could be found

of the pilot, who it is supposed was thrown into the deeper water and drowned.

At an inquest at Chingford on April 19th, on J. L. Lavigne, a young Canadian attached to the R.N.A.S., a verdict of "Accidental Death" was returned.

An inquest was held by a South Coast coroner on April 20th on 2nd Lieut. E. T. McLoughlin, R.F.C., who died as a result of injuries sustained through the fall of his aeroplane on April 19th. Deceased was making a flight in a monoplane when the mishap occurred, and the machine was seen to nose-dive to the earth. The officer was alive when assistance promptly arrived at the spot, but he died shortly after being removed. A verdict of "Accidental Death" was returned.

Lieut. A. Burns, R.F.C., was making an ascent on the South Coast on April 20th evening, when he appeared to lose control of the machine, which nose-dived to earth. He was still alive, though badly injured, when picked up, but died after his removal to hospital.

Meteorology and Flying.

At the meeting of the Aeronautical Society of Great Britain on Wednesday next, May 2nd, Capt. C. J. P. Cave, R.E., will lecture on "Some Meteorological Conditions which increase the Risks of Flying." The meeting will be held, as usual, at the Royal Society of Arts, John Street, Adelphi, W.C., and the chair will be taken at 8 p.m. by Sir Walter Lawrence, K.C.I.E.

THE USE AND ABUSE OF STEEL.

By Lieut.-Col. R. K. BAGNALL-WILD and Lieut. E. W. BIRCH.

(Continued from page 379.)

THE authors are strongly of the opinion that in addition to physical tests, analysis within reasonably wide limits, should be specified. There is no doubt that the designer, especially the engine designer, is finding that some steels are more suitable for certain purposes than others. Many steels may satisfy the specification, but differ in chemical composition. The following table illustrates the varying composition of a number of steels, which by suitable heat-treatments will all conform to the physical tests of one specification:—

C.	Si.	Mn.	S.	P.	Ni.	Cr.	Va.
0.284	0.035	0.375	0.014	0.031	5.07	0.434	—
0.242	0.127	0.435	0.027	0.029	5.07	0.040	—
0.336	0.088	0.490	0.027	0.010	4.38	1.44	—
0.380	0.294	0.450	0.020	0.017	3.90	1.449	—
0.376	0.230	0.590	0.023	0.031	3.87	0.868	—
0.294	0.169	0.400	0.020	0.016	3.80	0.468	—
0.306	0.198	0.435	0.022	0.022	3.66	0.599	—
0.410	0.088	0.560	0.032	0.030	3.46	0.607	—
0.264	0.110	0.435	0.024	0.025	3.37	—	—
0.113	0.024	0.290	0.026	0.034	3.30	—	—
0.140	0.121	0.595	0.016	0.020	3.02	0.060	—
0.452	0.181	0.660	0.030	0.028	2.94	—	—
0.420	0.311	0.470	0.010	0.025	2.72	0.060	—
0.402	0.336	0.430	0.031	0.025	1.23	1.007	—
0.400	0.130	0.570	0.030	0.020	0.07	1.000	0.32

It is very interesting to note that when the Royal Aircraft Factory introduced an impact test for Aircraft Steel, very considerable opposition was experienced. Records of tests show that in the earlier days impact test figures were very variable, and this was used as a basis for argument that the impact test as carried out did not give a true representation of the general properties of the steel.

To-day the impact test figures are far more regular, and in steels of a similar composition and tensile figures, from the same firm, the impact results are higher than they were two years ago. A number of experiments have been carried out in the Test House of the Aeronautical Inspection Department and elsewhere, with reference to the introduction of a round Izod test specimen. The results so far obtained have been extremely regular, but this may be argued not to be a sure indication of possible instability in the steel. At the present moment, however, even with the insufficient data available, it is thought that this form of test piece may be accepted in lieu of the square specimen.

The round test piece is suggested as the better, in that it eliminates the difficulty of machining to the standard form now in use. Inaccuracies in the "V" notch are thought to produce variations in the result obtained, but this is not altogether borne out in practice.

It is proposed not only to endeavour to introduce the round Izod test piece, but to allow it to be used with varying diameters. The amount of machining then required would be comparatively small.

The steel maker suffers from inspectors. There is no doubt that some inspection staffs are, owing to certain circumstances, forced to employ "diluted labour." The steel maker must recognise that there is a right of appeal to a senior inspector when he disagrees, and probably justifiably so, with an

arbitrary decision given by a junior official. In one case a steel was rejected by a department because the ultimate tensile strength was slightly above the maximum figure given in the specification, but the elongation was also slightly above the maximum figure. This particular cast was joyfully

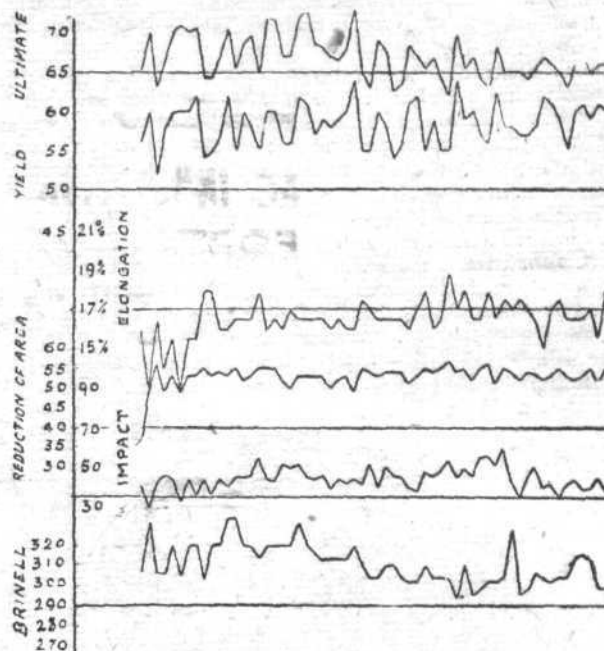


Fig. 12.—Curves showing variation in test results on a given steel obtained over a certain period. Horizontal lines indicate specification figures.

accepted by another department requiring steel to the same specification.

In this connection the authors cannot too strongly emphasise the lack of knowledge that unfortunately must exist in some cases under present circumstances; they refer not only to inspectors, but to users. Specifications which give maximum and minimum figures are not correctly interpreted. As an example, take a specification demanding: Ultimate, 50-60 tons per square inch; Elongation, 18-22 per cent. In the first place these figures are incorrectly stated; they should read: Ultimate, 50-60 tons per square inch; Elongation, 22-18 per cent. Now what does this mean? We assume that legally a purchaser must accept a steel giving 50 ultimate and 18 per cent. elongation, and that he should reject a steel giving 62 ultimate and 22 per cent. elongation. Such a reading is obviously erroneous. An inspector who is allowed to use discretion can and will accept a reasonable, logical and metallurgical reading of the figures.

The curves shown in Fig. 13 indicate the feeling produced by specifications in the steel maker's mind. They almost invariably attempt to go above specification minimum figures. This shows that the steel can be produced, but

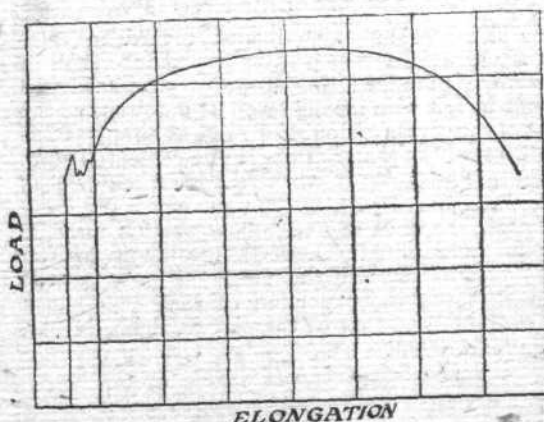


Fig. 13.

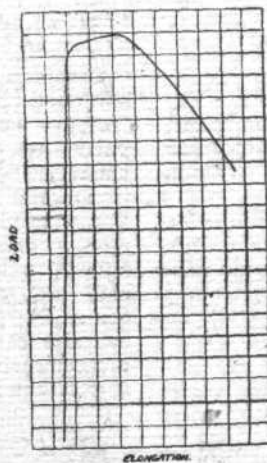


Fig. 14.

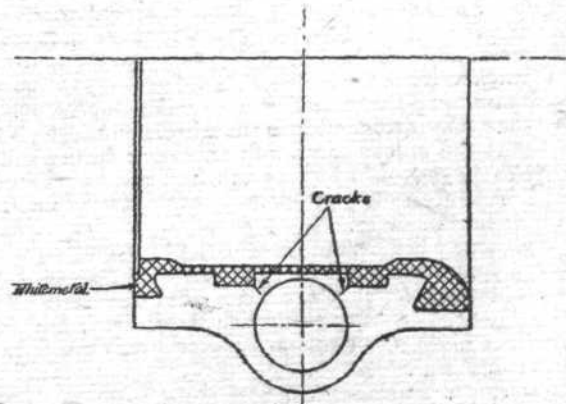


Fig. 15.

Fig. 13.—Stress strain diagram for mild steel. Fig. 14.—Stress strain diagram for high tensile alloy steel, heat treated to give about 90 tons per sq. in. tensile. Fig. 15.—Section of big end of connecting rod, showing position of cracks.

experience shows that an excess of scrap results from such attempts; the remedy would appear to be to reduce the specification figures. Such a reduction without defining the composition would be disastrous. For example, a medium carbon steel can be made to conform to a specification which is intended for a medium straight nickel steel, yet the properties of these two steels in use are totally distinct.

Much has been said with regard to the difficulty in determining the yield, though it is easy where carbon steels are concerned. A curve of the nature shown in Fig. 13 is obtained. With an alloy steel giving a high ultimate, the curve obtained is as shown in Fig. 14.

These diagrams will probably be subjected to criticism, but they are inserted to emphasise the different behaviour of the two classes of steel under load.

It is argued that as a difficulty exists in determining the yield point, it should be omitted from the specification. This is an erroneous idea, because in the majority of cases the steel is used in a state where the yield point can be determined and the curve shows a kick sufficient to be intelligible. It is but seldom that a steel is used in the state giving the second curve. Even if this were not so, the yield point, as distinct from the elastic limit, can be determined by a "non-diluted" inspector within reasonable limits.

It will be of interest to consider steel specification and production with regard to certain essential parts. With

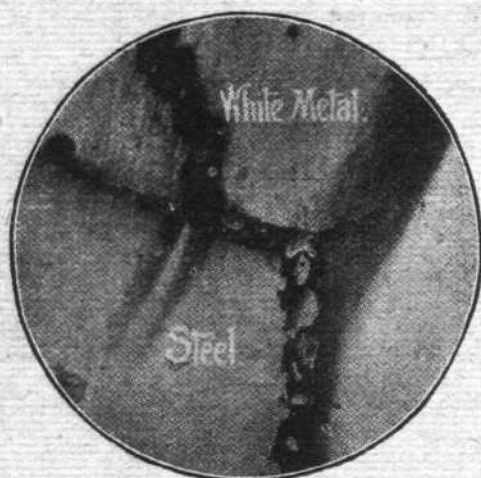


Fig. 16.—Enlarged view of cracks.
100 magnifications.

reference to connecting rods, the designers call for higher ultimate strength and yield point than is demanded for a crankshaft. Here it is thought that they have not given sufficient consideration to the engine revolutions which govern the stress. In many cases where the engine drives the airscrew direct, the engine revolutions must necessarily be in the neighbourhood of 1,200 per minute. When an engine is designed for a gear reduction the engine revolutions must be expected to be 2,000 per minute or over; considerable differences in inertia stress have therefore to be dealt with. The cases are somewhat different, and therefore more consideration should be given to the choice of steel for what are obviously two different conditions.

Another point which has been neglected by the designer is the danger arising from sharp corners. An example occurred in a connecting rod where the grooves for the white metal had this defect, and it was found that the rods repeatedly cracked from the corner of these grooves to the bolt hole. On examining these cracks under the microscope it was found that they extended into the white metal, which would indicate that the cracks came into existence during running. This is clearly shown in Fig. 15 and Fig. 16.

An interesting problem presents itself in a specification for streamline wire. It is possible to obtain the same tensile strength per square inch in the butt end of a streamline wire as that which can be obtained in the swaged down portion; cold work on the latter can of course to a certain extent be alleviated by a suitable heat-treatment, but such heat-treatment must also necessarily alter the condition of the material in the butt end, having the effect of lowering the tensile strength and increasing the elongation. The matter then

becomes interesting, because the gross breaking stress of the butt end should not be less than the gross breaking stress of the swaged portion. The butt end is of the diameter from which the streamline portion is swaged, and must have a less tensile strength per square inch than the swaged down portion, because the cold work in the latter increases its tensile strength.

Cold work beyond certain limits produces in the steel an undesirable structure that cannot be completely restored by subsequent treatment. Excessive cold work lowers the resistance to stress reversal. In this connection the following tables of figures obtained from actual tests are of interest:—

TESTS ON STREAMLINE WIRES.

Un-annealed.

BLADES.					BUTTS.			
Width. Inches.	Thickness. Inches.	Max. Load. Tons.	Tons per sq. in.	Elong. on 1 in. per cent.	Diam. Inches.	Max. Load. Tons.	Equiv. Max. Load. Tons.	Tons per sq. in.
0.302	0.076	1.39	77.0	8	0.208	2.09	1.04	61.4
0.285	0.078	1.35	77.5	8	0.207	2.03	1.02	60.3
0.292	0.074	1.30	76.6	7	0.207	2.05	1.03	60.8
0.298	0.073	1.35	76.5	8	0.209	2.14	1.06	62.3
0.298	0.077	1.40	77.2	8	0.208	2.16	1.08	63.5
0.292	0.077	1.39	78.5	7	0.207	2.14	1.07	63.5
0.412	0.098	2.40	75.4	9	0.293	3.92	1.84	58.2
0.405	0.099	2.42	76.8	9	0.293	4.03	1.89	59.7
0.413	0.098	2.39	75.2	8	0.293	3.95	1.85	58.5
0.397	0.096	2.26	75.5	10	0.290	3.92	1.88	59.4
0.406	0.094	2.29	76.3	10	0.291	3.92	1.88	59.4
0.415	0.096	2.36	75.7	6	0.292	3.98	1.88	59.4

Annealed.

BLADES.					BUTTS.			
Width. Inches.	Thickness. Inches.	Max. Load. Tons.	Tons per sq. in.	Elong. on 1 in. per cent.	Diam. Inches.	Max. Load. Tons.	Equiv. Max. Load. Tons.	Tons per sq. in.
0.301	0.075	1.19	67.2	14	0.207	2.05	1.03	60.7
0.297	0.073	1.12	65.8	10	0.208	2.02	1.02	59.4
0.293	0.075	1.17	67.8	14	0.207	2.00	1.01	59.4
0.294	0.073	1.08	64.2	16	0.208	1.83	0.91	53.8
0.299	0.075	1.24	70.4	13	0.208	2.16	1.08	63.6
0.294	0.075	1.21	69.7	13	0.209	2.03	1.00	59.2
0.414	0.098	2.18	68.6	17	0.293	3.85	1.81	57.0
0.404	0.095	2.11	70.2	13	0.293	3.90	1.83	57.8
0.413	0.097	2.22	70.6	8	0.294	3.90	1.82	57.4
0.406	0.096	2.05	67.2	6	0.293	3.94	1.85	58.4
0.408	0.096	2.06	66.9	12	0.293	3.97	1.86	58.9
0.412	0.092	2.13	72.5	9	0.293	3.98	1.87	59.0

The "Equivalent Max. Load" is the estimated load on an area equal to that of the core of the screw thread.

Considerable difficulty has existed with regard to case-hardened parts where weight is of greater importance than in ordinary engineering practice; in aircraft, case-hardened parts often cannot be left with a solid ore. It follows that the usual tensile test of the core is of doubtful value as a representation of the condition of the material under the cemented skin. For example, the gudgeon pin of an aero engine may be 25 mm. in diameter, and bored with an 18-mm. hole. To case-harden such a part, the ends of the hollow portion may be clay plugged, but undoubtedly a certain amount of the cementing gases passes through the plugs; in any case it is quite certain that the inner portion of this shell has a greater carbon content than that of the core in the solid bar, and its condition is different.

(To be concluded.)

The Army Council and Military Aeronautics.

In an Order in Council, published in the *London Gazette* of April 24th, setting forth the individual responsibilities of the members of the Army Council, the following appears:—

"(f) The Director-General of Military Aeronautics shall be

responsible to the Secretary of State for so much of the business relating to the administration of the Army Air Service as is not subject to the control of either the Air Board or the Ministry of Munitions, and as may be assigned to him from time to time by the Secretary of State."

The British Air Service

"PER ARDUA AD ASTRA"

Royal Naval Air Service.

Admiralty, April 17th.
Temp. Actg. Flight-Comdr. B. C. Bell confirmed in the rank of Temp. Flight-Comdr., to date Mar. 31st.

Actg. Sub-Lieut. A. C. Jelf promoted to Sub-Lieut., with seniority April 15th.

Temp. Prob. Flight Officers promoted to Temp. Flight Sub-Lieuts., seniority as stated: R. F. Collins, Jan. 24th; F. E. Fraser and J. W. Pinder, Feb. 21st; V. F. A. Dalwayne, Mar. 7th; F. T. P. Williams, Feb. 1st; A. T. Barker, Feb. 7th; P. B. Silk, Dec. 21st; and E. McD. Wright, Jan. 7th.

Admiralty, April 18th.
Sub-Lieut., R.N. (Flight-Lieut.) G. M. Thomas promoted to Actg. Lieut., seniority April 15th.

Admiralty, April 20th.
Flight-Comdr. F. A. Brock promoted to Temp. Actg. Wing. Comdr., date April 16th.

Flight-Lieut. C. E. Wood appointed Actg. Flight Comdr., date April 17th.
C. A. Elliott granted temp. commission as Sub-Lieut., R.N.V.R., seniority April 10th.

Ord. Seaman K. S. Wood, R.N.V.R., entered as Prob. Flight Officer for temp. service, date April 29th.

Royal Flying Corps (Military Wing).

London Gazette, April 17th.

Flight Commander.—Capt. H. Colmore, 7th Hrs.; 11th Mar.

Flying Officers.—2nd Lieut. W. R. Oulton, Ches. R., and to be sec'd.; 18th Mar. 2nd Lieut. F. J. Watts, Essex R. (T.F.), and to be sec'd.; 2nd Lieut. C. L. Johnson, Australian Light Horse. Mar. 23rd; 2nd Lieut. R. V. James, Durh. L.I. (T.F.), and to be sec'd.; 2nd Lieut. W. C. Campbell, S.R.; Temp. 2nd Lieut. F. W. Mathias, Gen. List; Temp. 2nd Lieut. W. R. Exley, Ches. R., and to be transf'd. to Gen. List; 2nd Lieut. L. A. Fuller, Durh. L.I. (T.F.), and to be sec'd. Temp. 2nd Lieut. H. Shaw, Gen. List; Mar. 24th. 2nd Lieut. (on prob.) M. G. Gunn, S.R.; Mar. 25th.

Flying Officers (Observers).—May 1st, 1916: Lieut. D. A. Tuck, Yeo. (T.F.), seniority Feb. 1st, 1916; Temp. Lieut. B. O. Newman, R.A., seniority Feb. 15th, 1916, and to be transf'd. to the Gen. List. The initials of Temp. Lieut. J. P. Colin, Gen. List, are as now described, and not as in the *Gazette* of Mar. 9th.

Park Commander.—Capt. (Temp. Maj.) the Hon. E. A. Stonor, R.F.C., S.R., from an Equipment Officer, 1st Cl., and to retain his temp. rank whilst so emp'd.; Apr. 4th.

Equipment Officers, 1st Class.—2nd Lieut. P. R. Burchall, S.R., from the 3rd Cl., and to be Temp. Capt. whilst so emp'd.; Jan. 31st.

2nd Class.—Lieut. F. G. M. Williams, S.R., from the 3rd Class; Feb. 23rd. Lieut. R. Scott, S.R., from the 3rd Class; Mar. 22nd.

3rd Class.—Temp. 2nd Lieut. G. Baillie, Gen. List; Dec. 31st. Capt. A. L. Gregory, M.C., 3rd Dorset R., S.R., and to be sec'd.; Mar. 28th.

Schools of Military Aeronautics.

Assistant Instructors (graded as Equipment Officers, 2nd Class).—And to be Temp. Lieuts. whilst so employed: Mar. 15th: 2nd Lieut. W. N. Cronshaw, E. Lan. R. (T.F.), an Equipment Officer, 3rd Cl.; 2nd Lieut. E. M. A. Van-der-Meersch, S.R., an Equipment Officer, 3rd Cl.

Supplementary to Regular Corps.—2nd Lieut. R. G. Fordham relinquishes his commn. on account of physical unsuitability as a pilot; Mar. 23rd. (Substituted for the notification in the *Gazette* of Mar. 22nd.)

General List (R.F.C.).—The surname of Temp. 2nd Lieut. (on prob.) R. E. Money-Kyrle is as now described, and not Money-Lyrle, as in *Gazette* of Mar. 8th.

London Gazette Supplement, April 18th.

Flying Officers.—Lieut. A. E. Wunsch, R.F.A. (T.F.) and to be sec'd.; Mar. 16th. 2nd Lieut. D. E. Marshall, W. York R., S.R. and to be sec'd.; Mar. 22nd. 2nd Lieut. E. A. H. Ward, W. York R. (T.F.), and to be sec'd.; Mar. 23rd. Mar. 24th: 2nd Lieut. (Temp. Lieut.) A. M. Makepeace, R. War. R. (T.F.), and to be sec'd.; 2nd Lieut. I. G. Roberts, R.W. Fus. (T.F.), and to be sec'd.; Temp. 2nd Lieut. E. Mycock, att'd. Ches. R., and to be transf'd. to Gen. List; 2nd Lieut. J. V. Wischer, R.G.A., S.R.; Lieut. J. D. McCall, Canadian Gen. List. Lieut. J. P. Robertson, Yeo. (T.F.), and to be sec'd.; Mar. 25th. Mar. 28th: Temp. Lieut. P. G. K. Bridgwood, York and Lanc. R.; Temp. Capt. R. B. Hay, R.A., and to be transf'd. to Gen. List; 2nd Lieut. A. I. Orr-Ewing, Yeo. (T.F.), and to be sec'd. 2nd Lieut. G. O. Shiner, Lond. R. (T.F.), and to be sec'd.; Mar. 30th.

Balloon Commander (graded as a Balloon Officer).—Temp. 2nd Lieut. W. G. Dreschfeld, Gen. List, from a Balloon Officer, and to be Temp. Lieut. whilst so employed; Mar. 31st.

School of Aerial Gunnery.

Commandant (graded as a Wing-Commander).—Maj. (Bt. Lieut.-Col.) E. B. Gordon, D.S.O., Northd. Fus., vice Capt. (Temp. Lieut.-Col.) L. A. Strange, M.C., Dorset R.; April 1st.

Memorandum.—2nd Lieut. J. O. Leach, M.C., Middx. R., to be Temp. Lieut. whilst serving with R.F.C., Mar. 24th.

London Gazette Supplement, April 19th.

Temp. appt. at the War Office:—

Staff Lieutenant.—Temp. Capt. L. S. B. Hall, R. W. Surr. R. (T.F.), from a Balloon Co. Comdr. (graded as a Flight-Comdr.), R.F.C., vice Temp. Lieut. (Temp. Capt.) W. J. C. Brown, Gen. List; Mar. 15th.

Flight Commanders.—From Flying Officers, and to be Temp. Capt. whilst so employed:—Temp. Lieut. F. G. Saunders, Gen. List; Mar. 27th. 2nd Lieut. J. D. Stodart, S.R.; April 1st. Temp. Lieut. E. L. Williams, Gen. List; April 3rd. From Flying Officers:—Capt. R. Oxspring, M.C., Yorks L.I., S.R.; Capt. D. R. Gawler, R. Scots, S.R.; April 6th. From Flying Officers, and to be Temp. Capt. whilst so employed:—Temp. Lieut. M. L. Taylor, Gen. List; 2nd Lieut. H. R. Harker, S.R.; April 6th. 2nd Lieut. H. G. White, E. Kent R.; April 11th.

Flying Officers.—Temp. Lieut. R. F. Palmer, R.E.; 2nd Lieut. D. F. Lepaick, Middx. R. (T.F.), and to be sec'd.; Mar. 1st. Temp. Capt. E. V. Longinotto, A.S.C., and to be transf'd. to Gen. List; Lieut. J. Macklem, R. Canadian Dns.; March 9th. 2nd Lieut. W. Taylor, E. Lan. R. (T.F.), and to be sec'd.; Temp. 2nd Lieut. K. G. Sclanders, Army Cyclist Corps, and to be transf'd. to Gen. List; March 13th. 2nd Lieut. B. H. Marshall, Yeo. (T.F.), and to be sec'd.; 2nd Lieut. E. H. Dimmock, S.R.; March 18th. Lieut. H. Rogerson, N. Lan. R. (T.F.), and to be sec'd.; March 21st. Temp. 2nd Lieut. W. S. Spence, R. Scots, and to be transf'd. to Gen. List; 2nd Lieut. J. G. White, Sco. Rif. (T.F.), and to be sec'd.; 2nd Lieut. (on prob.) D. F. Burton, Suff. R., S.R., and to be sec'd.; Mar. 22nd. 2nd Lieut. J. P. Dalley, Ind. Army, Res. of Off.; Temp. 2nd Lieut. A. Sleep, R. Lanc. R., and to be transf'd. to Gen. List; 2nd Lieut. G. W. Jackson,

Northd. Fus. (T.F.), and to be sec'd.; 2nd Lieut. (on prob.) N. H. Mackrow, S.R.; Temp. 2nd Lieut. B. Ord, Gen. List; Temp. Capt. A. E. Thomas, E. York R., and to be transf'd. to Gen. List; Temp. 2nd Lieut. (on prob.) A. R. Penny, Gen. List; Temp. 2nd Lieut. (on prob.) L. V. Thorowgood, att'd. E. Kent R., and to be transf'd. to Gen. List; 2nd Lieut. (on prob.) Count L. T. B. di Balme, S.R.; Temp. 2nd Lieut. (on prob.) P. L. McGavin, M.C., Gen. List; Lieut. F. W. Kante, Canadian Art.; Lieut. B. H. Smith, Canadian Gen. List; Mar. 24th. 2nd Lieut. J. H. Cooper, Arg. and Suth'd Highrs. (T.F.), and to be sec'd.; 2nd Lieut. J. G. Crang, S.R.; Mar. 25th. Lieut. R. Dodds, Canadian Inf. Bn.; Temp. 2nd Lieut. M. G. Jones, M.C., Northd. Fus.; Temp. 2nd Lieut. J. R. Wilson, Gen. List; Lieut. C. C. Statt, Oxf. and Bucks L.I., from a Flying Officer (Observer), seniority June 20th; Temp. Lieut. W. A. Bond, M.C., Yorks L.I.; Temp. 2nd Lieut. (on prob.) W. G. Milliship, Gen. List; Temp. 2nd Lieut. P. Wilson, Gen. List; Temp. 2nd Lieut. (on prob.) R. E. Conder, Gen. List. Temp. 2nd Lieut. (on prob.) L. H. Gamble, Gen. List; March 27th. 2nd Lieut. (Temp. Lieut.) E. A. Barltrop, R.E. (T.F.), and to be sec'd.; 2nd Lieut. N. A. Traylen, A.S.C. (T.F.); Temp. Lieut. G. E. Tyler, Motor Mach. Gun Corps, and to be transf'd. to Gen. List; 2nd Lieut. G. C. Burnside, Sco. Rif. (T.F.), and to be sec'd.; 2nd Lieut. B. G. Chalmers, Gord. Highrs. (T.F.), and to be sec'd.; Temp. 2nd Lieut. (on prob.) P. B. Jones, Gen. List; 2nd Lieut. F. Ellam, Lond. R. (T.F.), and to be sec'd.; 2nd Lieut. W. W. Fielding, Yeo. (T.F.), and to be sec'd.; Temp. 2nd Lieut. (on prob.) F. F. Babbage, Gen. List; Mar. 28th; Capt. W. A. Fleming, M.C., Devon R., from a Flying Officer (Ob.), seniority Mar. 13th; 2nd Lieut. H. R. Eyecott-Martin, R.E.; and Lieut. M. Thomas, Welsh R. (T.F.), and to be sec'd.; 2nd Lieut. (on prob.) C. G. Wood, S.R., March 29th; 2nd Lieut. (on prob.) B. A. Powers, Middx. Regt., S.R., and to be sec'd.; Temp. 2nd Lieut. (on prob.) V. Phillips, Gen. List; Temp. 2nd Lieut. B. O. Angell, Gen. List; Temp. 2nd Lieut. (on prob.) J. R. Drummond, Gen. List; March 30th.

Adjutants.—Lieut. R. L. Kennedy, Hrs., and to be sec'd.; Mar. 6th. 2nd Lieut. K. H. Marshall, Lond. R. (T.F.), to be sec'd., and to be Temp. Lieut. while so employed, vice Temp. Lieut. R. Addenbrooke-Prout, Gen. List; Mar. 11th. Capt. S. C. Raffles, R.W., S.R., from a Balloon Officer, vice Capt. J. W. Cruikshank, 3rd Durh. L.I., S.R.; April 3rd.

Park Commander.—Capt. J. W. Cruikshank, Durh. L.I., S.R., from an Adjut., and to be Temp. Maj. while so emp'd.; April 3rd.

Equipment Officers, 1st Class.—2nd Lieut. H. F. Anns, Lond. R. (T.F.), from a Staff Lieut., and to be Temp. Capt. while so emp'd.; Mar. 15th.

2nd Class.—From 3rd Cl.—Lieut. J. M. Furnival, S.R.; Mar. 27th. 2nd Lieut. H. I. Hughes, S.R., and to be Temp. Lieut. while so employed; Mar. 31st. Lieut. G. C. Gold, S.R., from an Adjut.; April 1st. Lieut. R. A. Courtney, S.R., from the 3rd Cl. (April 2nd); from 3rd Cl., and to be Temp. Lieut. while so employed, Temp. 2nd Lieut. G. E. Phillips, Gen. List; Temp. 2nd Lieut. T. N. Gilbert, Gen. List; April 3rd.

Schools of Instruction.

Group Gunnery and Armament Inspector.—(Graded as an Equipment Officer, 1st Cl.)—Capt. H. E. F. Wyncoll, M.C., Notts and Derby R., a Flying Off. (Ob.); Mar. 6th.

School for Wireless Operators.

Commandant (graded as a Park Commander).—Capt. J. B. Bowen, Yeo. (T.F.), an Equipment Officer, 1st Cl., and to be Temp. Maj. while so employed; Mar. 23rd.

Instructor (graded as an Equipment Officer, 2nd Class).—Temp. 2nd Lieut. R. Cook, Gen. List, an Equipment Officer, 3rd Cl., and to be Temp. Lieut. while so employed; March 23rd.

Supplementary to Regular Corps.

The following 2nd Lieuts. (on prob.) are confirmed in rank: T. Sherman, E. H. Dimmock, A. Graham.

To be 2nd Lieuts. (on prob.):—J. L'Estrange; Feb. 22nd. L. M. Williams; Mar. 17th. J. E. L. Wfench; Mar. 23rd. H. V. W. Stagg; Mar. 31st. A. E. Bush; April 5th.

London Gazette, April 20th.

The undermentioned to be Temp. 2nd Lieut. for duty with R.F.C.:—Sergt. T. K. Breakell from R.F.C., Mar. 10th.

Wing Commander.—Maj. A. C. E. Marsh, R.A., from a Squadn. Comdr., and to be Temp. Lieut.-Col. whilst so emp'd.; Mar. 6th.

Flight Commanders.—From Flying Officers:—Temp. 2nd Lieut. H. C. Todd, Gen. List, and to be Temp. Capt. whilst so employed; April 3rd. Temp. Capt. E. F. Elderton, Gen. List; April 5th.

Flying Officers.—Lieut. R. B. Sutherland, Can. Gen. List; Feb. 20th. Lieut. D. W. Rutherford, Aus. L.H. from a Flying Officer (Ob.); Feb. 21st, seniority July 15th. Feb. 23rd: Temp. 2nd Lieut. J. Bennett, Gen. List; Temp. Lieut. T. H. French, A.S.C., and to be transf'd. to Gen. List; Lieut. A. G. Goulding, Canadian Gen. List. Feb. 24th: Lieut. G. A. Radcliffe, Arg. and Suthd. Highrs., S.R., and to be sec'd.; 2nd Lieut. A. I. Campbell-Robertson, Hrs., from a Flying Officer (Ob.); seniority June 27th; 2nd Lieut. P. D. Montague, Rif. Brig. (T.F.), and to be sec'd.; Feb. 25th. 2nd Lieut. G. A. Andrews, Rif. Brig. (T.F.), and to be sec'd.; Feb. 26th. Temp. 2nd Lieut. (on prob.) E. M. Henderson, Gen. List; Mar. 6th. Temp. 2nd Lieut. I. L. Stockhausen, British W. Indies R.; Mar. 7th. 2nd Lieut. (Temp. Lieut.) W. J. Butler, R.E. (T.F.), and to be sec'd.; Mar. 8th. Temp. Lieut. A. C. Upham, D. of Corn. L.I., and to be transf'd. to Gen. List; Mar. 9th. Temp. 2nd Lieut. C. R. V. Cook, Gen. List; Mar. 22nd. Mar. 23rd: 2nd Lieut. J. H. Baring-Gould, Yeo. (T.F.), and to be sec'd.; 2nd Lieut. W. A. N. Smith, R.E. (T.F.), and to be sec'd.; 2nd Lieut. (on prob.) L. Wood, R.G.A., S.R. Mar. 25th: Temp. 2nd Lieut. (on prob.) H. F. Nicholls, Gen. List; Temp. 2nd Lieut. (on prob.) J. A. Westerman, Gen. List.

Equipment Officer, 1st Class.—2nd Lieut. (Temp. Capt.) E. E. Robb, Spec. Res. from the 2nd Cl., and to retain his temp. rank whilst so employed; Mar. 6th.

2nd Class.—From the 3rd Cl.—6th Mar. Lieut. J. Armes, S.R.; 2nd Lieut. A. Hingston, S.R., and to be Temp. Lieut. whilst so employed; and Lieut. L. R. Kerridge, S.R., from a Flying Officer, and to be Temp. Lieut. whilst so employed; Mar. 30th.

3rd Class.—Mar. 20th:—Temp. 2nd Lieut. W. M. Arnot, Gen. List; Temp. 2nd Lieut. K. S. Hughes, Gen. List.

Memoranda.—The undermentioned, from R.F.C., to be Temp. 2nd Lieuts. for duty with R.F.C. Mar. 20th: Flight-Sergt. W. M. Arnot, Corpl. K. S. Hughes. The undermentioned to be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.: Cadet E. J. Ralli; Mar. 28th. 1st Cl. Air Mech. H. E. W. McAndrew, from R.N.A.S.; April 1st. Cadet F. E. P. Langton; April 5th.

Aeronautical Inspection Department.

London Gazette, April 17th.

The undermentioned Temp. Hon. Lieuts. to be Temp. Hon. Capt. (without Army pay or allowances) whilst employed as Insps., A.I. Dept.; Feb. 1st: A. E. Steele, L. Warner.



Casualties.

News has been received of the death of 2nd Lieutenant O. F. G. BALL (22), son of the headmaster of the Shoreham Council Schools, who was killed by an unfortunate mischance while on observation duty as an officer of the Royal Flying Corps. Heavy clouds obscuring the view, 2nd Lieutenant Ball brought his aeroplane to a low altitude, and it was struck by a shell from one of our own big guns. Deceased joined the Royal Sussex Regiment on the outbreak of war, and was acting as a bombing instructor, when he obtained a transfer to the Royal Flying Corps in order to get to the front, where he had been serving seven months when he met his death.

Captain CLAUD PEREGRINE BERTIE, R.F.A. (T.) and R.F.C., aged 26, was the only son of Lieutenant-Colonel the Hon. George and Mrs. Bertie, of 36, Eccleston Square. He joined in the spring of 1909, and on the outbreak of war volunteered for foreign service. He served at the front from February to the end of September, 1915, when he was invalided home after an attack of diphtheria. He joined the R.F.C. as a pilot last September, and went with his squadron to the front at the end of February. On a day of heavy snowstorms he made an ascent to reconnoitre the new enemy lines and was reported missing, but he has since been reported killed in action.

Second Lieutenant ARTHUR DUPPA COLLINS, R.F.C., was the only son of the late Mr. W. P. Collins, of Beckenham, and Mrs. Collins, of 10, Lingfield Avenue, Kingston-on-Thames. Educated at Seafields, Bexhill-on-Sea, and Eastbourne College, he joined the staff of the P. and O. Company in London. In January, 1915, he enlisted in the Artists' Rifles, and went to France. He obtained his commission in the R.F.C. last January.

Lieutenant HAROLD GEORGE COLLINS, eldest son of Mr. D. George Collins, C.C., of Shirley Park, Croydon, aged 22, was killed in action in an aerial fight at the front on Easter Monday. He was Flying Officer (observer) in the Royal Flying Corps, and had for several months seen much air fighting. At the outbreak of war he enlisted as a private in the Buffs (East Kent Regiment), received his commission in the A.S.C., and volunteered to the Royal Flying Corps early in 1916. Lieutenant Collins was educated at Wellingborough College.

Flight-Commander SIDNEY EDWARD COWAN, M.C., R.F.C., reported missing in November, 1916, and now unofficially reported killed in action, was the youngest son of Mr. P. C. Cowan, D.Sc., of 33, Ailesbury Road, Dublin, Chief Engineering Inspector of the Local Government Board for Ireland. He was born in 1897, and educated at Castle Park, Dalkey, Marlborough College, and Trinity College, Dublin. A letter from an officer at the front, also a Marlburian, states that he came across the grave of his schoolfellow in an old graveyard at Ablainzeville, 12 miles south-east of Arras. It is railed in, and a cross at the head bears an inscription in German:—"In memory of a gallant English officer, Captain S. E. Cowan, killed in an air combat. November 17th, 1916." For a youth of 19, Captain Cowan had a fine record in the Air Service, having been three times decorated within a year. He gained the Military Cross in May, 1916, a bar to the Military Cross October 20th, 1916, and a second bar on November 14th. He won the Cross by an exploit which was described in the *Gazette* as follows:—"Dived on to an enemy machine in the enemy's lines, and drove it to the ground, where it was smashed, and then circled round and fired at the pilot and observer as they ran for shelter. Although forced to land through his engine stopping, he contrived to restart it, and got back under heavy fire." When he won the first bar it was officially stated:—"He has done fine work in aerial combats, and has shot down four enemy machines." Describing the feat for which the second bar was awarded, the *Gazette* stated that:—"He fought a long contest with seven machines, finally bringing one down in flames. He has displayed great skill and gallantry throughout."

Flight Sub-Lieutenant R. V. KNIGHT, R.N., aged 23, who had been flying for six months, and was an assistant instructor

at an East Coast Flying School, was killed in an accident on March 12th. He was the son of Mr. J. N. Knight of Milton Hill, Wells, Somerset. He was born at Milton Hill, Wells. Educated Wells and Bedford Grammar Schools, and at Neuchatel. He volunteered from Guy's Hospital on the declaration of war, and was appointed Lieut. in the 8th London (Post Office) Rifles, and fought with them at the battles of Festubert and Loos. At Rugby football he was reserve for England at 19, captained Bedford Grammar School, and held the East Midland and Somerset Caps. He was a good all-round sportsman, and was expert at skiing, skating, tennis, being especially good at ice hockey. An adept in swimming, diving and motor cycling, he was a good cricketer, and used to captain the Somerset Stragglers.

Captain GEORGE BARCLAY LOCKHART, 24 years of age, only son of Barclay Lockhart, J.P., Milton, Kirkcaldy, was killed in France on April 14th. He was educated at Kirkcaldy High School and Merchiston Castle School, Edinburgh, and at the Glasgow Technical College, and was afterwards associated with his father and uncle (Provost Sir Robert Lockhart) in the business of N. Lockhart and Sons, Linen Manufacturers, Kirkcaldy. Fond of outside sports, he was above the average in football, tennis, gymnastics, &c., and a keen motor cyclist. At Merchiston Castle he was a member of the O.T.C., and afterwards joined the Highland Cyclist Battalion, in which he rose to the rank of Captain. At the outbreak of war he volunteered for foreign service, but was kept with the H.C.B. on coast patrol duty. In June, 1916, he was attached to the Royal Flying Corps, and after a period of training as a pilot in England he went to France in November last, and took part in the active work of the R.F.C. at the front.

Definite information has reached the parents of Flight-Commander COLIN MACKENZIE, R.N., D.S.O., at Bath, which shows that he was killed in January last, when reported missing by the Admiralty. The communication received is based on information supplied by the German air service, which states that the British airman was buried at Achiet-le-Grand, near Bapaume. Flight-Commander Mackenzie won the D.S.O. and a French decoration last year for daring and skill.

Captain HENRY ARTHUR TAYLOR, M.C., Royal West Kent Regiment, attached R.F.C., was educated at Charterhouse and Sandhurst. He went to the front at the end of April, 1916, and joined the R.F.C. In August he was awarded the Military Cross for "conspicuous gallantry when on a bombing raid in unfavourable weather; he descended to less than 1,000 ft., and bombed a train, derailling several trucks." On September 25th, 1916, he was promoted flight commander and temp. captain. On September 27th he was shot down while leading a patrol against a largely superior enemy formation. Captain Taylor was the elder son of Mr. and Mrs. F. H. Taylor, of Wimbledon, and was only 18 years of age.

Captain VALENTINE O. TODD, King's Own (Yorkshire Light Infantry), killed, was the second son of Colonel O. Todd, A.M.S., and Mrs. Todd, and was 33 years of age. He entered the service in 1905, was promoted captain in February, 1915, and was attached to the Royal Flying Corps.

Lieutenant GEORGE EDWARD CLEATHER COLLINSON, Cameron Highlanders, who has been killed in a flying accident, was the only child of the late Mr. George Cleather Collinson and Mrs. Collinson, of 11, Foulis Terrace, S.W., and a nephew of Anna Countess of Moray. He was 20 years of age, and was educated at Marlborough College, where he won various cups for running and the long jump. He had just matriculated at Cambridge when war was declared, and at once obtained a commission. Early in 1915 he went to the front, and, proceeding later to Egypt, he went quickly through his training, and received his wings in the R.F.C., in which he was considered a keen and clever pilot. He returned to England in December, and was sent to one of the Northern flying stations, where he was stationed at the time of his death.

Missing.

Lieutenant MARTIN LEWIS, R.F.C., reported missing, is the son of Mr. and Mrs. Lewis Lewis, of Chalfont St. Peter, Bucks. When war broke out he was finishing his engineering studies at Liverpool University. He enlisted as a despatch rider, but was transferred to the Royal Flying Corps last autumn, and given his commission. For some time past he has been flying at the front as an observer, and when last seen was engaged in an air fight well over the enemy's lines.

Lieutenant FRANCIS GEORGE TRUSCOTT, M.C., Suffolk Regiment, attached R.F.C., reported missing and believed killed in the aerial battle on the 6th inst., was the elder son of Sir George Wyatt Truscott, Bart., Lord Mayor of London, 1908-9, and of Lady Truscott, and grandson of Sir Francis Wyatt Truscott, Lord Mayor, 1879-80. He was born in August, 1894, and educated at Rugby and Trinity College, Cambridge. Lieutenant Truscott represented his college at Henley in 1913. At the outbreak of the war, and while in residence at the university, he obtained a commission in the Suffolk Cyclist Corps, and went to the front. He won the Military Cross and was mentioned in despatches for bravery at Loos. Later on he joined the Royal Flying Corps, and a few weeks ago was instrumental in destroying two German aeroplanes.

Prisoners of War.

Second Lieutenant A. HOLDEN, R.F.C., who came from the Philippine Islands to join up, is a prisoner of war. Whilst flying at a height of 5,000 ft. over the German lines, he was hotly attacked, the machine was damaged, and he had to descend. Lieutenant Holden was officially reported missing, but German airmen dropped a letter in our lines intimating that he and the observer, who was wounded, were prisoners of war.

Lieutenant SIDNEY SMITH, of Southport, a member of the R.F.C., has sent a communication to his friends in Southport that he is a prisoner in the hands of the Bulgarians, his machine having been shot down behind the enemy lines. Lieutenant Smith joined the Liverpool Scottish as a private at the outbreak of the war and was awarded the D.C.M. for gallantry at Hooze in June, 1915. On this occasion he worked with a small party near the German trenches and killed 30 of the enemy with bombs. He was subsequently given a commission, and elected to join the R.F.C. He had been serving

on the Salonica front since last autumn. Prior to the war, he was the high diver at the Southport Pierhead.

Married and to be Married.

On April 8th at St. Martin's, London, Flight-Lieutenant F. M. L. BARR, R.N.A.S., eldest son of Engineer-Captain E. Barr, R.N., and Mrs. Barr, was married to DORIS BRUCE, daughter of Mr. and Mrs. J. Bruce, Westcliffe-on-Sea.

A marriage has been arranged, and will take place in June, between Major GEOFFREY HENRY COX, North Staffordshire Regiment and R.F.C., and EILEEN, youngest daughter of Mr. R. S. AUCHER WARNER, K.C., and Mrs. WARNER, of Trinidad, West Indies, and 193, Ashley Gardens, S.W.

The marriage took place at Holy Trinity, Brompton, on April 18th, of Captain C. J. W. DARWIN, Coldstream Guards and R.F.C., eldest son of Colonel and Mrs. Charles Darwin, Elston Hall, Newark, and Dryburn, Durham, and Miss SIBYL ROSE, youngest daughter of Mr. and Mrs. C. M. Rose, of 22, Hans Place.

A marriage has been arranged, and will take place on May 1st, at St. Peter's Church, Harrogate, between EDWARD NOEL GRIFFITH, Lieutenant, Oxford and Bucks Light Infantry, attached R.F.C., son of Colonel and Mrs. J. C. Griffith, Deanwood House, Cheltenham, and MARGERY JOAN, second daughter of Dr. and Mrs. WESLEY-SMITH, of Beech Grove, Harrogate, and Seaholme, The Riviera, Folkestone.

The marriage of Miss JANET ASHLEY HALL, daughter of Mr. J. Ashley Hall, of Cherry Orchard, Westbury-on-Trym, and Capt. CLIFFORD ALBAN HOOPER, R.F.C., took place at St. Mary's Church, Henbury, on April 17th. During the ceremony and after a large number of aeroplanes performed some clever manoeuvres round the church.

Items.

At St. Michael's Church, College Hill, a memorial service was held on April 23rd for Lieutenant FRANCIS GEORGE TRUSCOTT, M.C., attached R.F.C., who was killed in action on the 6th inst. In addition to the parents and relatives of the young officer there were present:—The Lord Mayor and Sheriffs, Colonel and Alderman Sir Charles Wakefield, Sir Vezey Strong, Sir Marcus Samuel, Sir John Bell, Sir William Treloar, Mr. G. A. Hanson, M.P., Sir John Humphery, Sir John Baddeley, Sir Horace Brooks Marshall, Sir William Soulsby, and other people of importance in the City.

**All in the Day's Work.**

FROM the British Headquarters on April 18th the *Times* Special Correspondent wrote:—"Here is the record of a single flight of one of our airmen, made within the last few days. I have cut out only the names of machines and such small details as might conceivably be useful to the enemy. Otherwise the record is precisely as it was written:—

"When our machines were attacked at Cambrai I attacked a hostile aviator at about 8,000 ft. I saw that I hit his engine as we closed with one another. I half-looped to one side of him and then he dived, with a large trail of blue smoke. I dived after him to about 4,000 ft. and fired about 50 rounds into him, when he went down absolutely out of control. I watched him spinning down to about 1,000 ft., the trail of smoke increasing.

"I was immediately attacked by three enemy machines, which drove me down to about 200 ft. We were firing at one another whenever possible, when at last I got into a good position and attacked one of them from above, having another on my right. I closed on the latter, turning in on him so close that I could get a sight actually on the pilot's head. I saw my bullets strike the pilot's head, and the machine then simply heeled over and span to the ground. The other two machines cleared off.

"Having lost sight of all the other machines and being so low, I decided to fly home at about that height, namely, 200 ft.

"A company of German cavalry going east along a small road halted and fired on me; also several machine guns opened fire.

"After going west for about five minutes, I was again attacked by an enemy single-seater, and as he approached I rocked my machine until he was within 50 yards. I side-looped over him and fired a short burst at him. He seemed to clear off, and then attacked me again. These operations were repeated several times with slight variations in the way I looped over him, until within about five minutes of crossing the line (flying against a strong wind), when he was about 150 yards behind me. I looped straight over him and, coming out of the loop, fired a good long burst. I saw where I

hit the pilot in the back, just above the edge of the cockpit. He immediately dived straight into the ground.

"I then went over the German trenches, filled with soldiers, and was fired on by machine guns, rifles, and small field guns, in or out of range. There was a lot of artillery firing going on, and many of our shells bursting in and about the German trenches, somewhere in the vicinity of the Cambrai road. I saw many small companies of infantry and cavalry, about 10 to 50 in each, going east along small roads. I noted no convoys or movement of artillery.

"I landed at the first aerodrome I saw. My machine was badly shot about.

"During this battle, besides their daily and chief job of observation on the enemy's guns and positions, our airmen have been continually raiding far into the enemy's country, and in these few days alone have dropped, in daylight, some 27 tons of explosives on enemy stations and depôts and stores and positions of all kinds. They have come down to spray the German infantry in the trenches and on the roads with their machine guns, and they have even attacked, and killed, when there has been no bigger game in sight, individual horsemen."

Air Work in the New Push.

WRITING to the *Daily Mail* regarding the new advance on Monday, Mr. W. Beach Thomas says:—

"The preface to the battle was of singular excitement. We shot down six German balloons, and the enemy made persistent dives from the air to retaliate on ours. Once our two observers leapt out in parachutes, landing safely, but their balloon was saved at the eleventh hour by one of our fighting aeroplanes, which routed the enemy within 100 yards of his target. The atmosphere on Sunday was miraculously clear. Our airmen, so often penalised by a strong west wind, exulted in a north-easterly breeze and rare visibility."

On the same day Reuter's correspondent wrote:—

"The day is fine and clear, and the airmen are taking a great hand in the combat. Our machines are successfully endeavouring to limit the enemy's powers of observation. In the fulfilment of this mission they yesterday brought down six great kite balloons."

AIRCRAFT WORK AT THE FRONT. OFFICIAL INFORMATION.

British.

General Headquarters, April 15th.

"Successful bombing raids were carried out by our aeroplanes yesterday, and valuable work was performed in co-operation with our artillery. Severe fighting took place in the air throughout the day. Four German aeroplanes were brought down and 11 others were driven down by our machines. Ten of our aeroplanes are missing."

General Headquarters, April 17th.

"In spite of exceedingly unfavourable weather much useful work was carried out by our aeroplanes yesterday. Three German machines were driven down damaged in air fighting, but in most cases the enemy avoided combat. Five of our machines are missing."

General Headquarters, April 18th.

"In the course of bombing expeditions carried out last night our aeroplanes obtained hits upon an enemy train, two hostile columns of mechanical transport, and a German transport park. Great damage was observed to have been caused in each case."

War Office, April 20th.

"Salonica.—Our aircraft bombed an enemy aerodrome, setting fire to a hangar and causing other damage."

General Headquarters, April 21st.

"Somewhat improved weather enabled our aeroplanes to carry out useful work yesterday. One hostile machine was brought down in air fighting. Two of our machines have not returned."

General Headquarters, April 22nd.

"There was considerable activity in the air yesterday, and much air fighting, in which four German machines were brought down and six driven down out of control. In addition to the above a hostile machine was shot down by our anti-aircraft guns. Four of our aeroplanes are missing."

General Headquarters, April 23rd.

"There was great activity in the air yesterday, in which our aircraft was entirely successful. In air fighting six German aeroplanes were brought down, and fifteen others were driven down out of control. In one engagement a hostile formation of eight machines was attacked by two of our aeroplanes, which brought down two hostile machines, and drove down a third out of control. Besides those destroyed in air fighting, one German aeroplane was shot down by our anti-aircraft guns. In addition seven German kite balloons were destroyed by us yesterday. Four of our machines are missing."

War Office, April 23rd.

"Mesopotamia.—As the result of an air fight on the 22nd, a new Halberstadt was brought down, the pilot, who was the enemy's flying corps commander, being killed, and the machine falling into our hands."

French.

Paris, April 14th.

"Salonica.—French aviators bombarded the revictualling centre of Bogdantsi, in the Valley of the Vardar."

Paris, April 15th.

"On April 12th and 13th our pilots in the course of numerous air encounters brought down 10 German aeroplanes, most of them in the district north and south of the Oise. Four other enemy machines were badly hit, and had to land in a damaged condition in their own lines. On the 14th inst. 11 enemy aeroplanes were brought down, two by the fire of our special guns. A captive balloon was also brought down in flames."

"Our bombing squadrons carried out the following operations: On April 13th 4,160 kilogrammes of projectiles were dropped on the railway stations and establishments of the Briey basin and 1,200 kilogrammes (over a ton) on the railway stations in the Mézières-Sedan region. Most of the objectives were hit. Finally, during the night from the 13th-14th the barracks at Dieuze and the railway station at Bétheniville were effectively bombarded."

Paris, April 17th.

"In the period from April 10th-15th our pilots accomplished many feats. Capt. Lecourt Grandmaison, Second Lieut. Languedoc, and Quartermaster Rousseau brought down respectively their fifth German machine. Lieut. Pinsart also brought down three enemy machines, which brings up to eight the number which he has destroyed up to to-day. Adjutant Vitalis brought down his seventh enemy, and Lieut. Deuillon his 13th. Finally, Capt. Guynemer gained his 36th victory."

Paris, April 20th.

"Since the 16th inst. ten German aeroplanes and two captive balloons have been brought down by our pilots in aerial encounters."

Paris, April 22nd.

"Yesterday evening German aeroplanes dropped several bombs in the region of Dunkirk. Three persons were slightly injured. The material damage done was small."

"On April 21st in the daytime three German aeroplanes were brought down by our pilots."

Paris, April 23rd.

"Salonica.—An enemy aeroplane was forced to land in the Koritza region. The two officers who manned it were taken prisoners."

Russian.

Petrograd, April 14th.

"In the region of Bohorodczany (Galicia) our airmen, Lieut. Makeinko, Ensign Guilcher, and 2nd Lieut. Yantchenko, brought down two German aeroplanes, which fell in the enemy's lines. The machine hit by Lieut. Makeinko was in flames. In Rumania, east of Focsani, the pilot Reveltisso brought down a German aeroplane."

Petrograd, April 15th.

"In the region of Boudslav railway station, north-east of Vileika, Pilot-Lieut. Waksowski brought down a German aeroplane. The machine caught fire, and its occupants perished. East of Bozejany Pilot-Lieut. Kokorinoff brought down a German aeroplane, which fell in our lines. A French pilot succeeded in dropping bombs on the enemy's batteries to the north of Matchin on the Danube."

Petrograd, April 16th.

"Pilot Sub-Lieut. Pachenko hit a German aeroplane, which caught fire and fell into the enemy's lines."

Petrograd, April 17th.

"On the Roumanian front there have been the usual rifle fire, scouting reconnaissance, and aerial operations."

"Our aviators brought down two German aeroplanes, which fell in flames at Morecesci, to the east of Focsany."

Petrograd, April 23rd.

"Caucasian Front.—On the rest of the front there have been rifle firing, scouting reconnaissances and aerial activities. In the region of Lake Miadziol our artillery brought down a German aeroplane, which fell within the enemy's lines. The enemy's aeroplanes threw bombs on the hamlet of Turetz."

Italian.

Rome, April 14th.

"Aerial reconnaissances carried out by both opponents led to several air fights; two hostile aeroplanes were brought down, one of our machines is missing. One of our air squadrons succeeded in dropping bombs on the railway stations of Prvacina and Vucia Draga, in the Frigido (Vipacco) Valley. Our aviators, flying low, came under heavy artillery and machine-gun fire, but all returned safely to their bases."

Rome, April 17th.

"There was some aerial activity. An enemy aeroplane was brought down during an aerial fight over Ternova."

"A squadron of enemy aeroplanes, supported by submarines and torpedo-boats, approached Venice during cloudy weather with a view to effecting a reconnaissance in force. An immediate counter-attack by combined Italian and French machines, aided by anti-aircraft batteries, prevented the hostile aeroplanes from reaching the city. During the aerial fighting which ensued and was continued far out to sea an enemy aeroplane was brought down. Two of our seaplanes failed to return to their base."

Rome, April 18th.

"One of our aerial squadrons bombarded Chiapovano, an important enemy revictualling centre to the east of the Spirito-Bansizza Plateau, in spite of violent fire from the enemy's artillery. Our aviators returned to our line unhurt."

Rome, April 19th.

"One of our aerial squadrons bombarded enemy huts in the neighbourhood of Chiapovano, Dornberg, Reifenberg and Comen. All our machines returned unharmed."

Rome, April 20th.

"Last night enemy seaplanes dropped bombs on various places on the lower Isonzo. No casualties or damage are reported. At the same time one of our airships bombed with good results the railway station and lines of Opicina, returning safely afterwards."

Rome, April 22nd.

"Yesterday one of our air squadrons bombed the railway centre between Prebacina and Dorimberga (Vippacco Valley). All our machines returned safely within our lines. During

the night one of our airships again dropped bombs on the same place, returning safely to its base."

German.

Berlin, April 14th.

"On the entire front, but principally in the battle sectors, there was increased air activity. The enemy lost in air attacks on April 12th, 11, and yesterday 24 aeroplanes and four captive balloons. An enemy air squadron was destroyed near Douai. Baron von Richthofen's chasing squadron alone shot down 14 aeroplanes, of which Baron von Richthofen accounted for three and Lieut. Wolff four."

Berlin, April 15th.

"In Artois, on the Aisne, in Champagne, and south of the Vosges there has been very lively aerial activity. The French, British, and Americans lost 17 machines in aerial engagements; four machines were shot down from the earth and two captive balloons. Baron von Richthofen brought down his 44th opponent, and Lieut. Schafer his 18th and 19th. From the three air squadrons which attacked Freiburg yesterday three British aviators were brought down."

Berlin, April 16th.

"A united attack made by enemy airmen against our captive balloons along the Aisne was without result. Between Soissons and Verdun the enemy yesterday lost eleven aeroplanes, the majority of which were of the latest type."

Berlin, April 18th.

"On the same day during aerial combat and by means of anti-aircraft guns, 18 enemy aeroplanes were shot down."



AVIATION IN PARLIAMENT.

Air Services Casualties.

Mr. JOYNSON-HICKS, in the House of Commons, on April 18th, asked what are the air casualties in killed, wounded, and missing in each of the last six months in the Royal Naval Air Service?

Dr. Macnamara: We do not think it altogether desirable to give the particulars asked for. In the event, however, of a Secret Session being held, I imagine my hon. friend would wish to take the opportunity of raising the matter.

Mr. Pemberton Billing: Will the right hon. gentleman state to the House why it is undesirable to give the figures?

Mr. JOYNSON-HICKS asked the Under-Secretary of State for War whether the Army Council has arrived at any decision to alter their predecessor's policy of giving particulars of air casualties; if so, what are the reasons; and, if not, whether he will give a list for each of the last six months stating the air casualties in killed, wounded and missing on the Western Front?

The Under-Secretary of State for War (Mr. Macpherson): The answer to the first part of my hon. friend's question is in the negative, and the second part does not therefore arise. With regard to the third part, I think that the question might be raised in the event of a Secret Session being held.

Mr. JOYNSON-HICKS: Does my hon. friend realise that the last Army Council did not object to the publication of these figures; if there has not been any change why should not the request be granted?

Mr. Macpherson: So far as I know the last Army Council took the same view of the question as we do now.

Mr. JOYNSON-HICKS: Having regard to the importance of this matter to those of us who take part in the Secret Session Debate would it not be possible to provide some of this information earlier in order that we may be able to look over it before the debate?

Mr. Macpherson: I cannot give any assurance as to that; but the hon. gentleman knows perfectly well that if any individual member of the House cares to go to the War Office he will be shown the figures.

Mr. JOYNSON-HICKS: Thank you; I will.

Mr. BILLING: Is the hon. gentleman aware that the present casualties on the Front are the gravest reflection on the administration of the Air Service?

Mr. Macpherson: No; I am not at all aware of that.

United States (Air Service).

Mr. BILLING (by Private Notice) asked the Chancellor of the Exchequer whether he will appeal to the Government of the United States of America to concentrate immediately on the construction and commission of a great Air Service, and also whether this Government is prepared to supply the American Government with sample machines, engines, drawings and specifications of our latest and most successful types, and to render them every other possible assistance to this end?

Mr. Bonar Law: This subject is already under consideration with the Government of the United States.

Mr. Lynch: Would it not be wise to allow the Government of the United States to decide these questions for themselves on the ground that one of the great assets is an infusion of brains, which are badly needed?

A Secret Session.

Mr. BILLING, on April 19th, asked the Prime Minister if he would arrange a Secret Session to enable him to give the members of the House of Commons the facts which were supplied to General Smuts and Sir Robert Borden, and which enabled them to make such assurances as to the condition of the Air Service?

Mr. Bonar Law: It is proposed to take the Estimates of the Air Board on Thursday next. The Government have decided that a Private Sitting of the House is desirable, and I hope to be able to say next week what arrangements will be made for it.

Mr. BILLING: Is it understood that this House will have the information which was supplied to General Smuts and Sir Robert Borden, which enabled them to make these statements?

Mr. Bonar Law: In the opinion of the Government it is desirable that there should be a public discussion of the Air Board upon the Estimates in the ordinary way. After that there will be nothing to prevent its being discussed in the Private Session to which I have referred.

Mr. BILLING: Can the right hon. gentleman say when the Air Board Vote will come off?



A Roosevelt for the Flying Service.

A REPORT from Ottawa states that Quentin Roosevelt, son of the ex-President of the United States, will take the

"At several places the airmen joined in the infantry engagements by the dropping of bombs and by the use of their machine-gun fire."

Berlin, April 21st.

"The unfavourable weather prevailing during the last few days has restricted aerial activity. Since April 17th seven enemy aeroplanes have been brought down in aerial engagements, and three by anti-aircraft guns."

Berlin, April 22nd.

"The enemy lost six aeroplanes in aerial battles yesterday. Of these five were shot down by Baron von Richthofen's chasing squadron."

"Naval airmen off Nieuport brought down an enemy airship, which fell into the sea in flames."

Berlin, April 23rd.

"Our aviators set fire to four enemy captive balloons, and in aerial battles brought down 11 aeroplanes. Cavalry Captain Baron von Richthofen was victor for the 46th time, and Lieutenant Wolff secured his twentieth victory. The chaser-squadron of Cavalry Captain Baron von Richthofen has so far brought down 100 enemy aeroplanes."

"Macedonian Front.—On the eastern bank of the Vardar and to the south-west of Lake Doiran there was violent artillery fire, which at Lake Dorian was followed by a British attack. This attack was repulsed by Bulgarian troops. One of our aeroplane squadrons participated in the battle."

Mr. BILLING asked the Prime Minister if he will request the Chairman of the Air Board to meet the Members of the House of Commons in secret conference before the Air Vote comes before the House.

The Parliamentary Secretary to the Air Board (Major Baird): The Prime Minister has asked me to answer this question. The Air Board Vote will be taken at an early date, and my noble friend considers it preferable that the public discussion of matters concerning the Air Services, for which the Vote will provide an opportunity, should precede any such conference as is suggested by the hon. member.

Mr. BILLING: Does not the hon. and gallant gentleman think it would be better that the Chairman of the Air Board should have an opportunity of making any statement he may wish to make to Members of the House before this discussion takes place, so that it might be found unnecessary to raise points which otherwise might be raised?

Major Baird: I have already given the hon. member the opinion of the Chairman of the Air Board which is contrary to the view taken by himself.

Rank Badges for R.N.A.S. Officers.

Mr. BILLING asked the First Lord of the Admiralty whether his attention had been called to the confusion and dissatisfaction occasioned in the Royal Naval Air Service by the fact that there is no outward distinction between flight-lieutenant, flight-commander and squadron-commander in the uniform of the Royal Naval Air Service; whether he is aware that in the Royal Flying Corps the following distinguishing marks have been adopted for these ranks: flight-lieutenant, two stars; flight-commander, three stars; squadron-commander, crown; and whether, under these circumstances, he will consider the advisability of introducing a regulation which shall permit flight-commanders to wear a small gold star above the eagle on the left arm, and squadron-commander a small golden crown in the same position, so long as they are attached to the air branch of the Royal Navy?

Dr. Macnamara: The principle of distinction of uniform between the ranks of flight-lieutenant, flight-commander and squadron-commander has been recognised by the Board of Admiralty; the details are now being worked out by the Departments concerned.

Mr. Boland asked the Financial Secretary to the War Office whether, in view of the expense entailed on young officers attached to the Royal Flying Corps who would have to scrap their old uniform and provide themselves with a completely new kit if the proposed new instruction is enforced, steps will be taken to cancel it?

Mr. Macpherson: Officers posted from other units to the Royal Flying Corps will during the first three months of their service with the Corps wear their former uniform. Those who are posted direct to the Royal Flying Corps on first commission will wear Royal Flying Corps uniform. Officers who return from abroad will conform within three months of their arrival in England, and officers serving at home by August 15th, 1917. These arrangements should obviate any hardship being incurred through the necessary change of uniform.

Design and Construction of Airships.

Mr. BILLING asked what control the Air Board has over the design and construction of airships for the Royal Naval Air Service?

Dr. Macnamara: The Air Board have no control over the design and construction of airships for the Royal Naval Air Service.

Accident near Grosmont.

Mr. T. C. TAYLOR asked the Secretary to the Admiralty whether the pilot of the naval aeroplane N 5,056 who, near Grosmont, in Yorkshire, fell and was killed on the 15th inst., was a trained aeroplane pilot; whether the cause of the accident has been ascertained; and, if so, could he state what it was?

Dr. Macnamara: This officer was under training; he was flying a Maurice-Farman aeroplane, on which type he had carried out four hours' solo flying previous to the accident. The pilot apparently got into difficulties in thick clouds and lost control of the machine, whose nose dived to the ground. The subsequent examination did not disclose any constructional defects in the machine.

Training of Pilots.

Mr. BILLING asked the Under-Secretary of State for War what is the minimum number of hours' flying insisted on before pilots are sent to the front?

Mr. Macpherson: I regret that this information cannot be given publicly as it would be useful to the enemy.



aviation course at Camp Borden, and qualify for overseas service with the Canadian Flying Corps or with the American Expeditionary Force if the latter is sent.

SIDE-WINDS.

VISITORS to the Austin Motor Works near Birmingham, who were familiar with that district before the war, would have a big surprise if they returned to the scene now. The place has grown out of all recognition, and one cannot help being filled with admiration for the enterprise and energy shown by the directors under the altered state of things since August, 1914. The floor space of the buildings then in existence was something like 7 or 8 acres, but now it is no less than 40 acres, and still growing at an amazing rate. Instead of giving employment to 3,500 persons there must now be a pay-roll of five or six times the number, and others appear to be taken on as fast as living accommodation can be provided for them. All kinds of "useful" articles are being manufactured, and not the least important department is that devoted to aviation, which is continually extending. The directors of the Austin Motor Company fully appreciate the importance of making their workpeople happy, and in consequence the Welfare organisation is carried out on the best lines. Playing fields have been provided and rest rooms and other places for recreation put up, while the latest addition is a handsome concert hall seating nearly 800 persons, where frequent concerts, entertainments, and cinema exhibitions are given with great success. It is under conditions such as these that the best work is produced, and there is evidently a proper spirit of camaraderie between employers and employed which is good to see. The quality of the work now being turned out in all departments is fully maintaining the high reputation of this well-known firm.

In their endeavours to assist their friends as much as possible, Messrs. Whiteman and Moss, of 15, Bateman Street, W., have decided to issue a fortnightly stock list, and all who wish to secure the regular arrival of this useful bulletin should send along their names to the firm as early as possible. The first list is due to be issued on May 6th, while the second will follow on May 20th.

THE demand for Glasso continues to mount up, and has led the Glasso Manufacturing Co. to seek larger premises for their works at 20, Stamford Road and Hertford Road, Dalston, N.1. At the same time more convenient offices have been secured at 209, City Road, E.C.1, next door to their old headquarters, and all communications should be so addressed in future. The 'phone call is still City 9558.

ANOTHER change to note. The Beatty School of Flying being now installed at the Broadway, Cricklewood, N.W.2, the telephone number is Hampstead 3000.

A USEFUL little brochure on "case-hardening" and the D.B.S. Carburiser in particular has just been issued by Messrs. David Brown and Sons (Huddersfield), Ltd., and copies can be obtained from the firm at Park Gear Works, Lockwood, Huddersfield, by any one interested. It is only in comparatively recent years that case-hardening has been employed on a large scale, but it is now in considerable demand. There is, however, great difference between the effects obtained with various steels, according to the amount of carbon in the steels. It is from their extensive experience of case-hardening that Messrs. D. Brown and Sons have been able to develop the D.B.S. Carburiser, which is a mixture for use in case-hardening processes.

Air Work in the Arras Battle.

In a message, written from the War Correspondents' Headquarters on April 18th, the *Times* Special Correspondent says:—

"The weather continues impossible. In place of the howling wind and squalls of the last few days steady rain set in during the night and has been falling all day, shrouding everything in a thick, November-like mist. It is as if the elements themselves hated the war.

"Unthinking people may say it is the same for both sides, but this is not true. Apart from the difficulty of rapid movement necessary to the attacking party, the thick mist robs us of all the advantage of our air supremacy and observation.

"We have the high ground now commanding the battlefield and a mastery in the air hardly less complete than in the Battle of the Somme. Each day enemy machines make, perhaps, a dozen crossings of our line, sometimes a few more, sometimes a few less, but, on an average, about a dozen, and every time a German machine comes over it scurries back again. Since the Battle of Arras began we have made daily over 400 crossings of his line—not hasty dashes, but deliberate reconnaissances, with careful observation, taking thousands of photographs and making long-distance raids and excursions over German territory.

"Probably to the airmen, almost more than to anybody else, we owe the completeness of our victory, for it is the information brought by our airmen that enables the guns to smash up the enemy's batteries and pound his defences to pieces.

"Our guns smothered every enemy battery within range; the observation of our airmen and the practice of our guns being equally admirable. It is wonderful to see everywhere along the line in the captured German positions, not only heavy guns knocked out by direct hits, but small machine gun emplacements, and always the firing is done as the result of aeroplane observation. Our flying men have paved the way for victory. The nation will never be grateful enough to the Royal Flying Corps for what it did on the Somme and is doing here to-day, in spite alike of the enemy and the storms.

"In the thick mist which veils everything as I write, enemy aeroplanes stay at home, safe from attack, and his infantry and gunners know they are safe from the eyes that watch from above, and the immediate sequel to whose watching is the terrible work of our guns. The bad weather is all in his favour, and all to our disadvantage."

The Aviation Pocket Book.

AVIATION has made such big strides within the last few years that many books which were quite good in their time are now hopelessly out of date. Realising this, Mr. R. Borlase Matthews has entirely rewritten his pocket book for 1917 and produced what is virtually a new book, one which can be recommended to all who are in any way interested in the technical side of aviation. Several new features have been incorporated, and in the section on air pressure and resistance and aeroplane theory and design valuable assistance has been rendered by Mr. J. D. North and Mr. E. O. Williams, B.Sc. The chapter on engines has been greatly extended, and another chapter which will be useful to mechanics is that on aeroplane alignment. There is also some practical information on flying in a wind, navigation, compasses, atmosphere, &c. The book now costs 4s. 6d., and is well worth it. It can be obtained from "FLIGHT" offices for 4s. 10d. post free.

PUBLICATIONS RECEIVED.

The Aviation Pocket Book, 1917. By R. Borlase Matthews. London: Crosby Lockwood and Son. Price 4s. 6d. net (post free 4s. 10d.). Not for export.

In the Royal Naval Air Service. By Harold Rosher, R.N. 4th Edition. London: Chatto and Windus. Price 1s. net.

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Index and Title Page for Vol. VIII.

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